Prepared for
Department of Education, School Infrastructure NSW
ABN: 40 300 173 822

ESD Report

SINSW02105 Glenwood High School

10-Nov-2021
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Client: Department of Education, School Infrastructure NSW

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Prepared by

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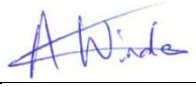
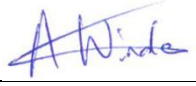
			Name/Position	Signature
1	27-Aug-2021	50% Schematic Design	Adriaan Window Associate Director	
2	27-Oct-2021	95% Schematic Design	Adriaan Window Associate Director	
3	10-Nov-2021	95% Schematic Design - Revised	Adriaan Window Associate Director	

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1.0 Introduction

1.1 Introduction

This ESD Report accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of a State Significant Development Application (SSD - 23512960).

The development is for upgrading works comprising alterations and additions to Glenwood High School at 85 Forman Avenue, Glenwood. The site is legally described as Lot 5227 DP 868693.

The site is roughly rectangular in shape, with a total area of 60,790m2 and street frontages to Forman Avenue to the south and Glenwood Drive to the east. Glenwood Reserve adjoins the northern and western boundaries of the school.

This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs), specifically:

- Identify:
  - How ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) 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 a 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).
- 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 NARCliM 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.
- Relevant Policies and Guidelines:
  - NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections.

1.2 The Proposal

The proposed development seeks to upgrade Glenwood High School. The upgrade consists of the following alterations and additions:

- Construction of a new three-storey building at the north-eastern portion of the site facing Glenwood Park Drive which will accommodate new learning spaces;

- Construction of one storey performance pavilion;
- Refurbishment of existing Building Block A (ground floor only) to provide one new support unit within the space of an existing general learning space;
- Refurbishment of Building Block D (ground floor only) to provide an additional office space and storeroom;
- Refurbishment of Building Block E to re-purpose it on the ground floor for computer learning spaces, staff and administration spaces as well as upgrades to the library on the first floor;
- Refurbishment of Building Block J to re-purpose it from visual arts and performing arts to learning spaces and workshops for food tech and woods/metal unit;
- Demolition of existing botany room and construction of a new single storey pavilion comprising of interview rooms and end-of trip facilities; and
- The proposed development will also involve ancillary works at the site associated with the proposed upgrades.

2.0 Sustainability Principles

2.1 Overview

In alignment with School Infrastructure NSW (SINSW) sustainability principles of “meeting the needs of the present and not compromising the ability of future generations to meet their own needs”, an integrated building design approach will be taken for the project. This report outlines the scope and initiatives of the project which promote sustainability, specifically in the social, economical and environmental context.

2.2 Statutory Requirements, Policy and Guidelines

The advice and deliverables of this report are in alignment with the statutory requirements including but not limited to:

- SINSW Educational Facility Standards and Guidelines (EFSG)
- Environmental Planning and Assessment Act 1979,
- Environmental Planning and Assessment Regulation 2000,
- National Construction Code (NCC 2019),
- Relevant Local Environment Plans (LEPs) and State Environmental Planning Policies (SEPPs) & planning controls and,
- NSW Government Resource Efficiency Policy (GREP).
- GANSW Environmental Design in Schools Manual (GANSW, 2018).
- NSW and ACT Government Regional Climate Modelling (NARCliM) Climate change projections.
- Green Building Council of Australia Green Star Guidelines.

2.3 Response to SEARS Requirements

The following section describes the design responses to the ESD principles as defined in Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. These design principles have been incorporated into the holistic design with input and coordination of the design team.

Refer to Section 4.0 Sustainable Design Initiatives and Appendix A Green Star Scorecard for further details.

Table 1 SEARS ESD principles and response

SEARS ESD Principles	Design Response
Clause 7(4) (a) The precautionary principle: If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by-- 1. Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and 2. An assessment of the risk-weighted consequences of various options,	The project will be designed to avoid damage to the environment, through the use of efficient fixtures, rainwater harvesting, and recycled water to toilets to reduce freshwater use. This project will minimise the effect on climate change with reduced reliance on grid electricity with the use of photovoltaic panels, high performing façade, and efficient services. A climate adaptation and operations resilience plan has been developed to assess the risk of potential impacts of climate change and potential shocks and stresses to the project. Any high or important risks identified will be mitigated in design. Refer to the Appendix for summary of outcomes following this assessment. This project has also been designed in accordance with the Connection with Country framework to reduce the impacts of fire, drought and flooding.
Clause 7(4) (b) Inter-generational equity: The present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,	The project will use waste management strategies, sustainable materials, and employ low carbon materials to limit further damage to the health, diversity and productivity of the environment for future generations. In order to achieve a goal of maintaining or enhancing our environment, the project must at the very least procure carbon offsets and renewable energy to achieve a net zero carbon position. While this will enable this projects contribution to eliminate (as much as practical) its climate-change contribution, opportunities to enhance within the scope of the site boundary are limited.
Clause 7(4) (c) Conservation of biological diversity and ecological integrity: Conservation of biological diversity and ecological integrity should be a fundamental consideration	This project design is to preserve as much existing natural soil, hydrological flows and vegetation. This project will consider the local biological diversity and integrity of the site by retaining as much of the existing flora and fauna habitats at the site and provide for planting of native tree species to offset any removal due to the project.
Clause 7(4) (d) Improved valuation, pricing and incentive mechanisms: Environmental factors should be included in the valuation of assets and services, such as-- 1. Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, 2. The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the	Whole of life costs will be evaluated in accordance with the best outcome for the user. This costing exercise of services and assets includes the planning, design, construction and acquisition, operation, maintenance, renewal and rehabilitation, depreciation and cost of finance, and replacement or disposal.

SEARS ESD Principles	Design Response
use of natural resources and assets and the ultimate disposal of any waste, 3. 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.	Onsite waste is to be diverted from landfill and a waste management plan has been developed to address operational waste. A net zero carbon action plan is in development to establish the best cost-effective pathways to meeting a net zero carbon target by 2050.
Proposed measures to minimise consumption of resources, water (including water sensitive urban design) and energy.	The project shall achieve a 5 Star Green Star rating using the Green Star Buildings rating tool. As described by the Green Building Council of Australia: "Green Star is an internationally recognised rating system that delivers independent verification of sustainable outcomes throughout the life cycle of the built environment. Green Star's mission is to "lead the sustainable transformation of the built environment". Green Star aims to achieve this by encouraging practices that: • Reduce the impact of climate change. • Enhance the health and quality of life of inhabitants and the sustainability of the built • environment. • Restore and protect the planet's biodiversity and ecosystems. • Ensure the ongoing optimum operational performance of buildings. • Contribute to market transformation and a sustainable economy.
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 a 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).	
How the future development is responsive to the NARCliM projected impacts of climate change	A Climate Change Adaptation and Operational Resilience assessment was undertaken to address the climate projections and potential risks to the project into the near future (2030) and far future (2090). This project was benchmarked against NARClim and CSIRO projections, and the worst-case impacts of climate change have been assessed. All extreme and high risks have been identified and responded to in design such as: • Selection of equipment for higher future temperatures. • Fire proofing including additional filters to non-flammable façade. • Additional filters to air systems to reduce bushfire smoke egress. Refer to the Appendix for summary of outcomes following this assessment.

SEARS ESD Principles	Design Response
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.	As per the Civil design the project contains a series of pollution control devices to reduce stormwater pollution with the following devices: - Litter screens in stormwater pits. - Trash screed in detention tank. - Ocean Protect StormwaterFilter cartridges. An existing Onsite Detention Tank (OSD) has been designed with an additional 210m^3 of capacity to manage stormwater runoff from major storm events. This design reduces the runoff discharge to meet the Green Star Buildings Credit Achievement benchmark and Blacktown City Council pollution reduction targets. The new building also includes the following design initiatives to reduce demand on potable water use: - 50,000 L Rainwater tank servicing the toilets. - Efficient taps, showers, and toilets to GREP and Green Star requirements. - Recycled (non-potable) water utility supply to toilets to meet demand not serviced by rainwater tanks. With the initiatives the building achieves a 78% reduction in potable water compared to a standard practice building. This is currently achieving Exceptional Performance under the Green Star Buildings Tool. For further details refer to section 4 of this report.

3.0 ESFG Sustainability Targets

3.1 Overview

The Educational Facilities Standards and Guidelines (EFSG) have been developed by SINSW to provide a reference guide for the management, planning, design, construction and maintenance of new and refurbished school facilities.

The EFSG DG02 prescribes the minimum compliance guidelines for Ecological Sustainable Development (ESD). Refer to the EFSG schedule in Appendix B for elements incorporated in the design and is to be completed by the contractor. This section explores these guidelines and how the project will address them. Additionally, the project will implement sustainability initiatives discussed in Section 4.0.

3.2 NSW Government Resource Efficiency Policy

The NSW Government Resource Efficiency Policy is mandatory for all NSW Government agencies, including the Department of Education. Its purpose is to reduce operating costs by implementing resource efficiency measures.

The project will be targeting a 5-star Green Star Buildings rating for the new building, in addition to the incorporation of sustainability initiatives targeting resource efficiency detailed in this report.

3.3 Energy Conservation

The project is targeting a 5 star Green Star Buildings rating. As such, the building will target a modelled energy reduction of between 20%-40% better than minimum compliance under the National Construction Code (NCC) 2019. In accordance with the NSW Government Resource Efficiency Policy, the building must be designed such that energy consumption is predicted to be at least 10% lower than minimum compliance with the NCC requirements. This will be exceeded under the current Green Star targets.

3.3.1 Lighting

Natural daylight has been connected to enhanced learning outcomes and has beneficial effect on health and wellbeing by improving the indoor environmental quality of a space. Additionally, it reduces reliance on artificial lighting and associated energy consumption. Therefore, natural lighting will be favoured in design.

Artificial lighting design will seek to optimise energy efficiency through:

- Energy efficient LED lighting type.
- Sensors to rooms to reduce or turn off lights when sufficient daylight is provided.
- Incorporate natural daylight into lighting design.
- External window shading applied to facades subject to direct sunlight (due north, east and west).
- Localised switching with automatic timers.

3.3.2 Lighting and HVAC Controls

All new lighting and HVAC systems installed will have timed or sensor feedback functionality for energy conservation. HVAC will have CO2 control to classrooms

3.3.3 Energy Efficient Appliances and Equipment

The minimum rating for each appliance type used on the project in outlined in below. In accordance with the NSW Government Resource Efficiency Policy, these ratings are at least 0.5 stars above the market average star rating.

Table 2 Energy Efficiency of Appliances

Appliance	Minimum Rating
Refrigerators	2.5 stars
Clothes dryers (up to 10 kg)	3 stars
Washing machines	3.5 stars
Dishwashers	4 stars
Pool pumps	7.5 stars
Fridge/freezers	3.5 stars
Freezers	3 stars
Air-to-air heat pumps and air-conditioners • less than 4 kW • greater than 4 kW	 4 stars 3 stars
Televisions	5 stars

3.3.4 Renewable Energy Generation

Photovoltaic (PV) solar power grid-connect rooftop systems will be provided as renewable energy sources to reduce greenhouse gas emissions and offset power consumption costs at the school.

3.4 Water Conservation

3.4.1 Water efficient appliances

All new water fittings/fixtures will be at least 0.5 stars above the average Water Efficiency Labelling and Standards (WELS) star rating by product type (except toilets and urinals to be the average WELS star rating). The minimum used on the project are outlined below:

Water Fitting/Fixture	Minimum WELS Rating
Showerheads	3.5 stars
Toilets	4 stars
Urinals	5 stars
Washing machines	4.5 stars
Dishwashers	5 stars
Taps and flow controllers	5 stars

Additionally, to minimise water usage and wastage, the project will seek to implement:

- Flow restrictors for staff amenities.
- Taps with timed flow for student amenities.

3.4.2 Roof Water Harvesting and Tank Storage

To reduce potable water demand, rainwater harvesting and tank storage will be included for rainwater reuse. This rainwater will be used for toilet flushing and irrigation for adjacent landscape/gardens. Where there is no available rainwater the toilets shall use the recycled non-potable water source provided to the school. The toilets shall be also connected to the utility non-potable water source to

further reduce the reliance on potable water. The design will seek to use a gravity-fed system to further reduce energy demand and maintenance requirements.

3.4.3 Water Sensitive Urban Design

Water sensitive urban design (WSUD) principles will be implemented on the project to minimise the transportation of toxicants to waterways and other offsite environments. Stormwater treatment is provided in line with Blacktown City Councils Stormwater pollution targets.

3.5 Sustainable Materials

Construction materials will be selected with consideration of the following:

- Adequately and economically perform their intended functions
- Contain reduced/no hazardous substances for improved indoor environmental quality.
- 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.
- Reduce the demand for rare or non-renewable resources.

3.5.1 Timber

Timber is visually warm, calming, comforting, and contributes to a positive experience for building occupants. It has numerous benefits, which include:

- Hypoallergenic with easy-to-clean smooth surfaces, preventing particle build-up common on softer finishes.
- Durable, easily maintained, dust-free after installation and produce few, if any, harmful emissions / vapours.
- Unique for biophilic design because it is both a natural material and a structural / building material, serving both functional and biophilic purposes.
- Timber products, after harvest and manufacture from trees, continue to store much of the carbon of trees that helps tackle climate change and reduce greenhouse gases. In the case of timber buildings, this carbon is kept out of the atmosphere for the lifetime of the structure, or even longer if the timber is reclaimed and manufactured into other products.

The project will seek to favour timber as a material and use only recycled, engineered and glued timber composite products, or timber from plantations/sustainably managed regrowth forests that is FSC, AFS or PEFC certified.

3.5.2 Low VOC

All surface coatings, and other volatile organic compound (VOC) emitting products including adhesives, sealants, carpets, carpet tiles and carpet underlays, will be selected to contain low or no VOCs to reduced occupants' exposure to harmful emissions.

3.5.3 Pesticides

No chemical pesticides or termicides will be used onsite. Preventive treatments by physical means and careful design to minimise risk will be detailed in the project Environmental Management Plan.

3.6 Ecological Conservation

The project has favoured ecological conservation through the retention of existing trees around the perimeter of the site, the integration of the natural amenity and views and providing environmental conservation educational opportunities.

An assessment of the biodiversity values of the site has been undertaken to ensure the project does not pose significant impact on endangered flora or fauna. As per the current Biodiversity Assessment Report (BDAR) the site did not identify any existing threated fauna or flora species. The Glenwood

BDAR has indicated a number of avoidance and minimisation measures to ensure the development will not directly impact nearby vegetation zones.

3.7 Waste Management

The school is committed to maximising conservation of natural resources and minimising environmental harm from waste and the disposal of waste.

3.7.1 Construction and demolition waste

Opportunities for re-use and recycling of materials in the construction phase will be identified and implemented. A minimum waste diversion rate target of 90% has been stipulated. Further, end of life material reuse and recycling initiatives and procedures will be considered and developed.

3.7.2 Operational Waste

A waste storage area will be included in the design to provide source separation bin stations and appropriate signage of waste and receptacles for multiple waste streams. An operational waste management plan (OWMP) will 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 will include the following principles:

- Waste avoidance
    - Reduce consumption of resources through green purchasing, i.e. purchasing items with reusable, recyclable or no packaging, or are biodegradable.
- Waste minimisation
    - Examining all processes to determine where wastes are produced and to devise measures for waste prevention or reduction
    - Devising ways of reducing waste with students so they too can share in the savings (for example rewards for students who reduce waste)
    - Partnering with others to assist with waste minimisation.
    - Keeping track of changes and improvement.
- Reusing
    - Reusing drums, cartridges and containers where possible.
    - Selling or donating usable waste materials to other organisations.
- Increase recycling
    - Investigating alternative uses for organic waste that cannot be reduced or reused, e.g. composting, bio-gas from waste, organic digester.
    - Diverting recyclable wastes from the general waste
    - Provision for a bin station at a central location in school with the option of source separation Provision of clear waste signage to ensure source separation
    - Explore opportunities for recycling waste types not included in the mandatory stream separation, e.g. batteries, coffee cups, e-waste.

3.8 Climate Change Adaptation

The project has been designed for climate change resilience to ensure the school is resilient to and responsive to natural climate-change induced hazards, such as floods, storm surges, inundations, heatwaves, bush fires, extreme storm and other weather events. A comprehensive climate change risk assessment has be undertaken to identify and treat (with design measures) any high or extreme risks identified. This includes flood and fire risk assessment of the site.

Overall, this will safeguard the school to shocks and stresses to avoid social and economic costs of interrupted operation and repairing or replacing damaged assets.

3.9 Sustainability Benchmarking

Benchmarking will be undertaken to achieve a 5 star rating against the Green Star credits using the Green Star Buildings scorecards. Refer to Section 4.0 for the preliminary assessment undertaken.

3.10 Views

The building design will ensure that at least 60% of primary occupied spaces have a clear line of sight to high quality internal or external views, within 8m of the space. These high-quality views include:

- External views - vegetation, body of water, sky, or frequent outdoor movement (people, vehicles, animals).
- Internal views - landscaped area, water features, atrium.

4.0 Green Star Sustainable Design Initiatives

4.1 Overview

The project is targeting a 5 Star Green Star Buildings v1 rating, as per the Educational Facilities Standards and Guidelines. Green Star Design & As Built is due to be phased out by the 17th December 2021 and is to be replaced by Green Star Buildings v1.

AECOM have developed the following pathway:

- 5 Star Green Star Buildings v1 (minimum 35 points + minimum expectations)

Green Star Buildings has several mandatory elements noted as Minimum Expectations (ME). These minimum expectations must be achieved for every green star rating regardless of the target. Many of the credit criteria are common to both rating tools, and these two pathways have been developed to similar principles and EFSG goals.

Mandatory credits have been reviewed by the project team and the SINSW Sustainability team. The SINSW Sustainability team is currently aligning their policies and procedures with the Green Star Buildings tool

The following figure below shows the desired outcome for the project. The full Green Star strategy for this project has been included in the Green Star Score Card in the Appendix A.

Figure 1 shows the current scorecard indicating the overall allocation of points towards the target rating. Points have been allocated as follows and the totals are cumulative across each column:

- "Low Risk / Cost" indicates the total point tally associated with credits planned within the design with few unknowns to resolve.
- "TBC Med Risk / Cost" and "TBC High Risk / Cost" indicates other points that the team is currently planning to target but that require further resolution and/or may carry an enhanced level of risk through procurement and construction phase of the building. Targeting of these points is to be confirmed through remaining design phases to construction. Further analysis and discussion during future design stages will determine whether these points can be re-allocated to the "Planned" column.
- The "Stretch" column contains points that the team believes are highly unlikely to be targeted at this stage, generally due to current constraints or the type/nature of the project. However, these credit points are technically achievable, and this pool of credits provide opportunities to substitute initiatives that are currently planned should the need arise.

		RRENT STRATEGY COMBINATI			
	Points Available	Low Risk / Cost	TBC Med Risk /	TBC High Risk /	Stretch
NON-INNOVATION	97.0	21.0	25.0	6.0	10
INNOVATION	10	0	0	0	0
TOTAL TARGET POINTS	107.0	21.0	25.0	6.0	10
RAW CUMULATIVE SUM		21.0	46.0	52.0	
RISK ADJUSTED CUMULATIVE (MED RISK =75%, HIGH RISK =50%)		21.0	39.8	42.8	
NET ZERO OPERATION PATHWAY POINTS	(RAW)	10.00	NOT ACHIEVED		
	(RISK ADJUSTED)	8.00	NOT ACHIEVED		
POINTS REQUIRED (5 Star)		35.0			
PATHWAY OUTCOME	(RAW)	4 Star	5 Star	5 Star	
	(RISK ADJUSTED)	4 Star	5 Star	5 Star	

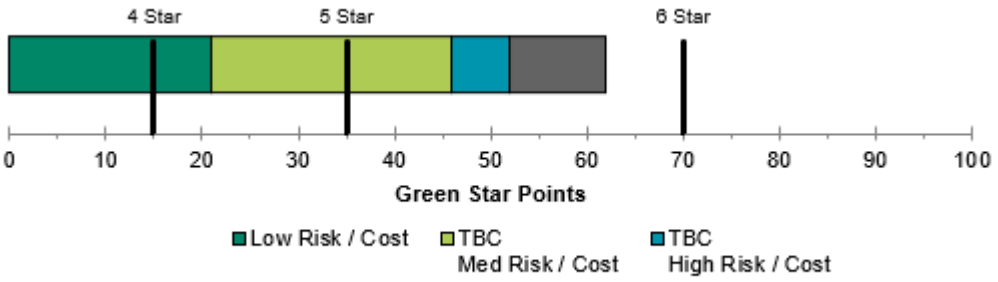


Figure 1 Green Star Buildings Summary

4.2 Energy

Green Star Buildings	Positive

The purpose of the credits in the “Energy” category is to reduce the overall operational energy consumption below that of a comparable standard-practice building, which in turn will reduce greenhouse gas (GHG) emissions and operating costs for building owners and occupants. This project intends to comply with the Green star performance-based pathway, by demonstrating performance improvements in energy efficiency and GHG emissions of the Proposed Building in comparison to a NCC Section J-compliant building.

The project strategy includes the following:

- High performance HVAC system with air-to-air energy recovery and CO2 demand control.
- High efficiency LED lighting with daylight harvesting.
- Maximisation of photovoltaic capacity.
- Automatic shut off on vertical transport.

Performance Metrics – Energy

Currently without PV the building is achieving a 23.2% reduction in energy compared to a business-as-usual “Reference” building. With the 99.5kW PV system an estimated 128,181 kWh is to be generated which further reduces the energy to 50.9%. This aligns with the Green Star buildings Exceptional Performance of 30% reduction.

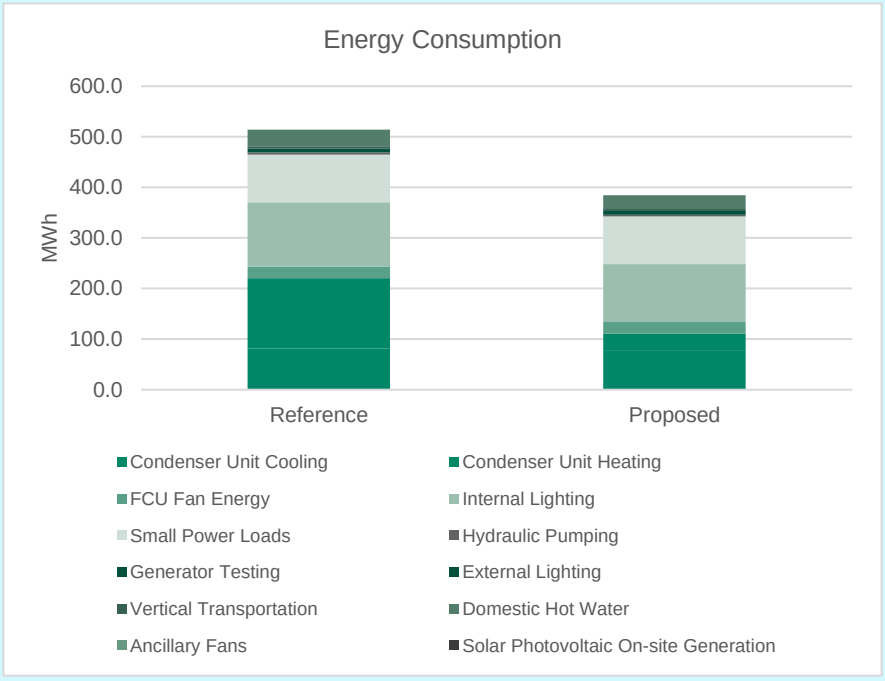


Figure 2 Energy Modelling Results

4.3 Materials

Green Star Buildings Responsible, Positive

Responsible procurement of products, materials and services reduce resource consumption by encouraging the selection of lower-impact materials, as well as reduction and recycling of generated waste. The project's strategy includes the following:

- Reduce upfront carbon impacts by reduction of Portland cement content in concrete with replacement with fly ash as per EFSG recommendations
- Commit to the responsible sourcing of materials such as steel, timber and other elements by procuring from certified suppliers only and limiting the use of PVC.
- Source materials and systems which meet transparency and sustainability requirements under recognised third-party initiatives and programs.
- Reduce construction and demolition waste by reusing or recycling building materials.

Performance Metrics – Materials

Upfront carbon emissions have been reduced in the current design with the following initiatives:

- 40% of Portland cement content reduced in cement.
- 60% by cost of internal finishes to have an Environmental Product Declaration (EPD).
- Use HDPE in place of PVC where possible, or alternatively Best Practice PVC.

4.4 Water

Green Star Buildings Positive

Initiatives under the "Water" category aim to reduce potable water consumption. The project will undertake the Performance pathway option, by completing the Potable Water Calculator and including the following strategies:

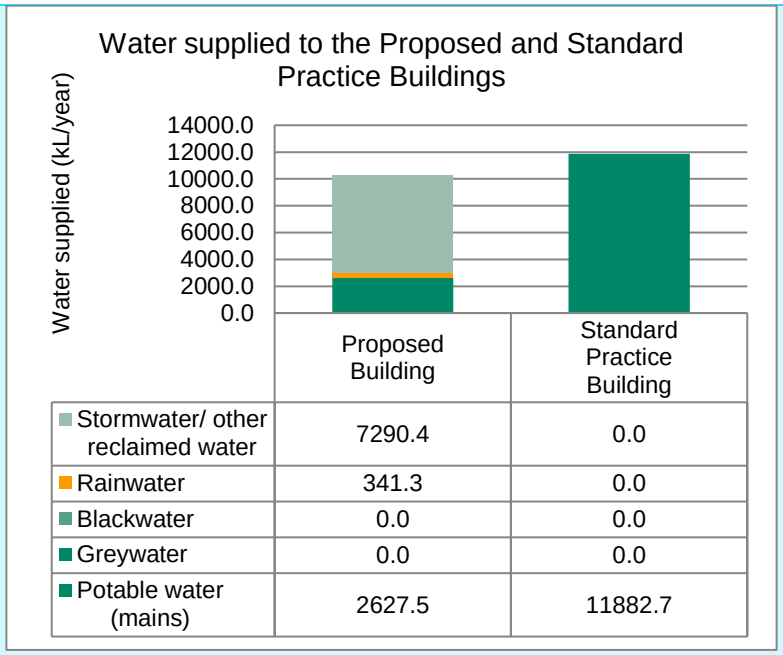
- Install efficient sanitary fixtures.
- Incorporate rainwater capture and reuse.
- Incorporate recycled water for reuse for toilets
- Waterless heat rejection
- Limit landscape irrigation requirements through xeriscaping and low-consumption irrigation systems.

Performance Metrics – Water

The new building includes the following design initiatives to reduce potable water use

- 50,000 L Rainwater tank servicing the toilets.
- Efficient taps, showers, and toilets.
- Recycled (non-potable) water utility supply to toilets to meet demand not serviced by rainwater tanks.

With the initiatives the building achieves a 78% reduction in potable water compared to a standard practice building as determined with the Green Star Potable water calculator.



	Proposed Building	Standard Practice Building
Stormwater/ other reclaimed water	7290.4	0.0
Rainwater	341.3	0.0
Blackwater	0.0	0.0
Greywater	0.0	0.0
Potable water (mains)	2627.5	11882.7

Figure 3 Water Consumption

The project aims to reduce the environmental impacts of 'point source' pollution in line with the by minimising stormwater pollution with Water Sensitive Urban Design

Performance Metrics – Water Sensitive Urban Design (WSUD)

The project contains a series of pollution control devices to reduce stormwater pollution with the following devices

- Litter screens in stormwater pits.
- Trash screed in detention tank.
- Ocean Protect StormwaterFilter cartridges.

This reduces the runoff discharge to meet the Green Star Buildings Credit Achievement benchmark. Note the average flow reduction has not been reduced.

Runoff discharge from site meets the following pollution reduction targets

- Total Suspended Solids (TSS) 89.9% (Green Star Target 85%).
- Gross Pollutants 100% (Green Star Target 100%).
- Total Nitrogen (TN²) 45% (Green Star Target 45%).
- Total Phosphorus (TP)² 76.2% (Green Star Target 65%).

The proposed Onsite Detention Tank (OSD) has been designed with an additional 210m^3 of capacity to manage stormwater runoff from major storm events.

4.5 Waste

Green Star Buildings Responsible, Positive

Reduction of operational waste by providing facilities to separate distinct waste streams for collection. The project is engaging a specialist waste management consultant to develop a project specific operational waste management plan. Presently the design includes a dedicated centralised waste storage area. Collection bins / storage containers will be provided for building occupant use. Facilities

will cater for collection and separation of multiple waste streams including, general waste and recyclable items such as paper, cardboard, glass, plastic and organics.

Performance Metrics – Waste

An Operational Waste Management Plan (OWMP) is currently in development and has provided the following waste targets:

- 70% increase in recycling rates to 70% for municipal solid waste
- 75% total waste diverted from landfill

The OWMP outlines the provisions for the following waste separation streams:

- General waste.
- Paper and cardboard.
- Comingled recycling including glass.
- Soft plastics.
- Container Deposit Scheme.
- Food and organics.

4.6 Amenity

Green Star Buildings Places, Healthy

This category encourages initiatives that enhance the comfort and well-being of occupants through the following:

- Provide high indoor air quality through effective ventilation, CO_2 control, and exhaust of pollutant streams.
- Maximise acoustic comfort by restricting internal noise levels and reverberation times as appropriate and provide acoustical privacy between rooms.
- Maximise lighting comfort by reducing flicker and providing appropriately-coloured lighting, reducing glare, and providing local lighting control for occupants.
- Provide visual comfort by reducing glare from sunlight while enabling high quality internal and external views.
- Maximise daylight and natural ventilation using operable glazing and clerestory windows.
- Restrict indoor pollutants such as VOCs and formaldehyde in internal finishes and wood products.
- Maximise thermal comfort such that at least 90% of all occupants will be satisfied with parameters such as temperature, humidity, and air velocity.

Performance Metrics – Daylight and Views

Due to the extent of glazing with a high VLT of greater than 40% the project achieves a Credit Achievement under Credit 11 from Green Star Buildings. Refer to below example of daylight experienced through the external façade and clerestory windows.

The clerestory windows provide high levels of daylight to the classrooms on the upper levels and provide a path for cross ventilation to meet EFSG natural ventilation requirements.

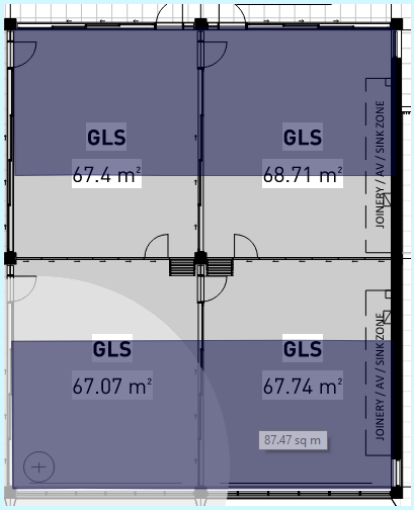


Figure 4 Example Daylight Coverage

4.7 People and Place

Green Star Buildings	People, Places

This project aims to reduce occupant dependency on private car use, by favouring alternative transport options. The project has targeted a performance pathway approach by completing the Sustainable Transport Calculator in accordance with Green Star which includes the following indicators:

- Demonstrate that the site is accessible by public transport.
- Encourage active transport modes through provision of end-of-trip facilities which are compliant with the Green Star criteria.
- Demonstrate that the project is in a walkable neighbourhood accessible to a range of amenities.

In addition, the landscape and architecture will be designed with connection to country to create a multicultural school community.

Performance Metrics – Transport

A Sustainable Transport Plan has been developed in line with Green Star Building requirements.

The transport plan provides:

- A review of the school's travel demand.

- The establishment of transport modes to promote during construction and post-occupancy.

- Identification of transport improvements required to meet school travel demand.

- Actions to inform the site design, master plan, Construction Traffic and Pedestrian Management Plan and Travel Plan.

- Actions to address road safety concerns.

- Compliance with the Transport Planning Advisory Note.

As per an approved Green star technical request:

Projects within the Schools Infrastructure NSW Umbrella (GS-6039DA) may target Credit Achievement 'Developing a sustainable transport plan' under credit 27 Movement and Place within Green Star Buildings using the SINSW Schools Transport Assessment process

4.8 Ecology and Landscape

Green Star Buildings Nature

Credits under the “Land Use and Ecology” category aim to encourage projects to minimise harm and enhance the quality of local ecology. The strategy for the project will include:

- Improvement of the ecological value of the site as measured using the Green Star Ecological Value Calculator.
- Incorporate elements in the project site area which reduce the impact of the heat island effect.
- Managing light pollution to neighbouring bodies and night sky through design.

Performance Metrics – Ecology and Landscape

A qualified ecologist is has prepared a Biodiversity Plan with key actions to maintain the ecological integrity or biodiversity of the site. The current Biodiversity Assessment Report (BDAR) the site did not identify any existing threated fauna or flora species. The Glenwood BDAR has indicated a number of avoidance and minimisation measures to ensure the development will not directly impact nearby vegetation zones. This is in line with the Green Star Buildings framework.

The project minimises light pollution to neighbouring bodies design to AS 4282:1997 Control of the obtrusive effects of outdoor lighting.

Light pollution to night sky has been avoided with selection of external lighting with a low (<5%) Upward Light Output Ratio (ULOR).

4.9 Innovation

Green Star Buildings Leadership

Several innovations have been identified by Sustainability workshop and alignment with EFSG policy these will be developed following technical questions with the GBCA.

The following have been identified as potential innovation points to target:

- Ultra-low VOC paints to be specified by the architect.
- Green Cleaning as per current facilities management services contract. This aligns with Whole of Government Facilities Management Services (Asset Maintenance and Cleaning) contract which contains Green Cleaning provisions that have been accepted by the GBCA for this credit.
- An economic efficiency study could be undertaken to quantify the net benefit to society and the environment for implementing Green Star.

- Provide information regarding the cultural significance of the site on a platform available to the public and aboriginal culture.
- A case study could be undertaken for the project for GBCA to use in marketing materials.
- An estimation of the design and implementation costs associated with each implemented Green Star credit will be made available to the building industry.
- Colourful umbrellas with school logo for shade whilst walking to school/make encourage walking in the rain and make it fun for the kids.

Performance Metrics – Ultra low VOC paints and sealants

The EFSG require low VOC and formaldehyde content in line with Green Star requirements:

- Interior wall and ceiling paint <16 g/L TVOC.

- General Purpose Sealants <50 g/L.

- Primers sealers and prep coats <65 g/L.

- Acoustic sealants, waterproof membranes and fire-retardant sealants and adhesives <250 g/L.

4.10 Certification Process

The Green Star process should commence at the earliest stage possible (ideally pre-concept) and is completed when the project is certified. Certification of Green Star projects for either the Design or Certified ratings can involve up to three stages:

- Round 1 submission and assessment (typically 6 week assessment duration). Outcome from this round could result in the rating being achieved or with assessment comments requiring resolution through Round 2;
- Round 2 submission and assessment (typically 4 week assessment duration). Outcome from this round is likely to result in the rating being achieved but GBCA assessors can seek additional discretionary evidence to be submitted within 72 hours.

This process is outlined in Figure 3.

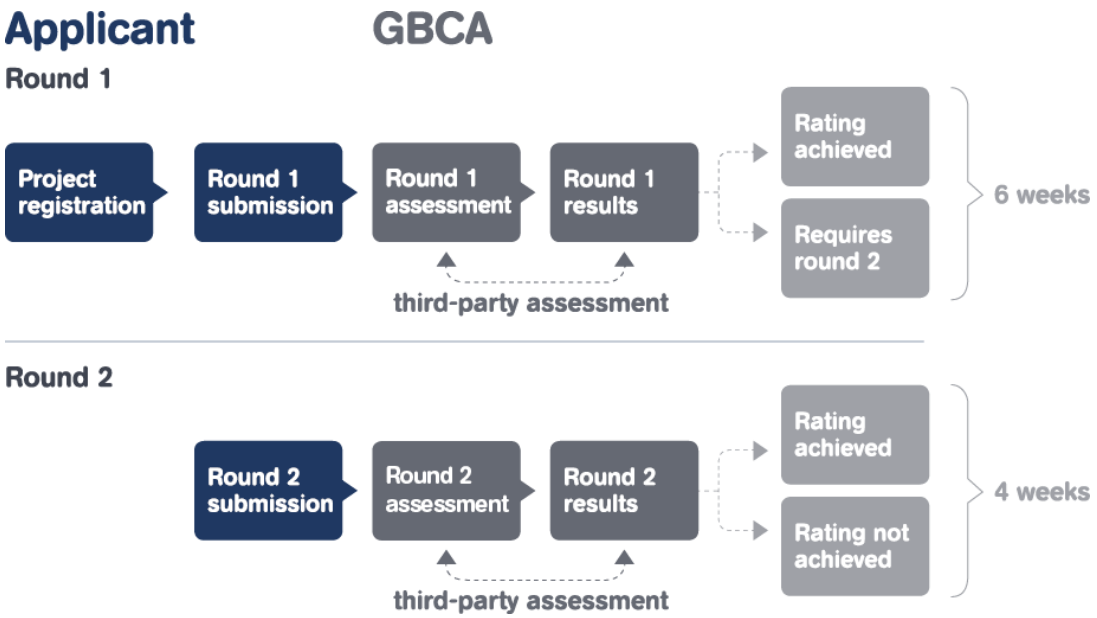


Figure 5 Green Star assessment process. (Source: GBCA, 2018)

The final rating shall be collated partially during construction with most documentation collated post-construction after final commissioning results and As Built documentation is created. This rating is to completed within 2 years of Practical Completion.

Appendix A

Green Star Buildings Scorecard

Green Star Strategy

	#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
Responsible	3	Verification and handover	ME	Metering and monitoring	Mandatory						Electrical / Mechanical / Hydraulic	SINSW	The building must have accessible energy and water metering for all common uses, major uses, and major sources. The meters must be connected to a monitoring system capable of capturing and processing the data produced by the meters. The meters and monitoring systems must: - Provide continual information (up to 1-hour interval readings); - Be commissioned and validated per the most current 'Validating Non-Utility Meters for NABERS Ratings' protocol, or National Measurement Institute (NMI) standards; - Ensure all meters including utility meters and sub-meters to have accuracy declarations and/or certificates (for an example Utility Meters will have certificates issued by the National Measurement Institute) - Sub-meters that are not to be used as utility (billing) meters should either have Certificates for accuracy issued by NMI or a test certificate from the European Measuring Instruments Directive - 2004/22/CE - Where the building's Gross Floor Area (excluding car parking areas) is smaller than 1000m2, unless specialist equipment with an annual power consumption of 100kwh/annum, is present in the building, a single meter for energy and a single meter for water will comply with this minimum requirement. If accessible to the building manager, the utility meter is acceptable provided it meets accuracy and data collection requirements above. The monitoring system must accurately and clearly present the metered data and include reports on consumption trends for the automatic monitoring system. The monitoring strategy must be developed in accordance with a recognised Standard, such as CIBSE TM39 Building Energy Metering	**Drawings** showing the location of all energy and water meters in the project and the associated energy and water uses **Letter of confirmation** from the contractor/metering provider/manager demonstrating that the metering systems are continually and automatically monitored by a system that is able to produce alerts if any inaccuracies are found **Copy of Monitoring Strategy document** specific to the building **Automatic monitoring system data sheet** describing the systems features and capabilities	Approved TQ for Green Star Buildings that allows our FMWeb platform to satisfy the log book requirement. Meters are being provided to the design.
			ME	Commissioning and tuning	Mandatory						SINSW	ICA	The project team must perform the following prior to construction: -Set environmental performance targets; and - Perform a services and maintainability review During construction and practical completion: - Commission the building; and - Engage building tuning service provider After practical completion: - Tune the building over the next 12 months Airtightness review requirements during SD, DD and CN - airtightness test in accordance with AS/NZS ISO 9972:2015 Thermal performance of buildings determination of air permeability of buildings - Fan pressurisation method.	**Service and Maintainability Report** where the service and maintainability review is summarised **Extract(s) from the Commissioning Report** demonstrating that comprehensive pre-commissioning activities and commissioning activities have been performed **Building Tuning Commitment** or contract demonstrating that there is a requirement for a building tuning process **Whole building airtightness testing report** detailing of test methodology, air flow rates, details of airtightness considerations from schematic design through to construction and statement that the target air permeability from the energy model has been achieved **Signed confirmation from the testing practitioner and main contractor** that the results have been sighted	
			ME	Building information	Mandatory						Services Engineers	SINSW	-The project team must provide operations and maintenance information for all nominated building systems to The building owner (or designated representative) -The project team must develop a building log book (TM31) to present to The building owner (or designated representative) before practical completion of The project. -building user information provided and able to be updated and edited by The facilities management team, or other appropriate stakeholder groups, to ensure it remains current and relevant to users throughout The life of The building.	**Owner's project requirements** document, or an equivalent document, defining the nominated building systems **Operations and maintenance information** **Building log book** **Building user information**	
			CA	Soft landings framework	1		1			Construction/ Operation	ICA	All	The soft landings framework is applied has five parts: – Briefing (Stage 1) – Design development (Stage 2) – Pre-handover (Stage 3) – Initial after care (Stage 4) – Years 1 to 3 aftercare (Stage 5) (Optional)	**Evidence of implementation of BSRIA framework**	Soft landings not targeted . Independent Commissioning Agent (ICA) required to achieve this credit
			CA	Independent commissioning agent						Design, Construction, Operation	SINSW	ICA	An ICA must be appointed to advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.	**CV of the Independent Commissioning Agent** detailing the qualifications and experience relevant to the project **Letter from building owner** confirming the appointment of an ICA **Evidence of implementation of BSRIA framework**	Review in undertaken by SINSW as ICA
	4	Operational waste	ME	Separation of waste streams	Mandatory						Waste	SINSW	The building must provide bins or storage containers to building occupants to enable them to separate their waste. These bins must be labelled and easy to access, and evenly distributed throughout the building. They must also allow for separating the following as a minimum: - General waste going to landfill; - Recycling streams to be collected by the building's waste collection service, including paper and cardboard, glass, and plastic; and - One other waste stream. This may include collecting any of the following waste types: organics, e-waste, batteries etc. Any other single waste stream (except food waste) that represents more than 5% of total annual operational waste (by volume) must also be accounted for.	**Site Plan and/or architectural plans** highlighting the location of relevant waste facility areas, demonstrating: Separation of waste streams; Dedicated waste storage area; Access to waste storage area. **Calculations** used to demonstrate that the dedicated waste storage area provided is adequately sized **Details on how the dedicated waste collection areas meet best practice guidelines**, in line with third-party best practice guidelines	OMWP is in development
			ME	Dedicated waste storage area	Mandatory						Waste	SINSW	A dedicated area, or areas, for the storage and collection of the applicable waste streams must be provided. The storage area must be sized to accommodate all bins or containers, for all applicable waste streams, for at least one collection cycle. The calculations used to demonstrate that the area provided is adequately sized to handle the recyclable waste streams specified must be based on: - Forecasted waste generated by occupants; and - Collection frequency for each waste stream.		
			ME	Signoff by waste specialist and/or contractor	Mandatory						Waste	SINSW	A waste specialist and/or contractor must sign-off on the designs to confirm they are adequately sized and located for the safe and convenient storage and collection of the waste streams identified.		
	5	Responsible procurement	CA	Risk and opportunity assessment	1	1				Design	All	AECOM	Prior to appointment of the Head Contractor, the project team must undertake a risk and opportunities assessment of 10 or more key items in the project's supply chain (as selected by the project team) to identify environmental, social and human health risks and opportunities following ISO 20400 Sustainable Procurement – Guidance. At least one of 3 areas is to be represented: - Building Services - Plant and Equipment - Materials The risk and opportunity assessment must address at least the following issues: - Human rights; - Labour practices; - The environment; - Fair operating practices; - Consumer issues; and - Community involvement and development.	**Extract from supply chain risk and opportunity assessment**	Risk and opportunities assessment of its supply chain to identify environmental and social risks and opportunities. Requires **assessment of procurement processes against ISO 20400 Sustainable Procurement - Guidance** and demonstrate active efforts to address at least one identified risk and opportunity in its supply chain.
			CA	Responsible procurement plan						Design	All	AECOM	The project team must develop a plan for how the project will responsibly procure 10 or more key items mitigating risks and implementing opportunities identified in the Assessment following ISO 20400 Sustainable Procurement – Guidance as a guide to developing the plan. The plan must: - Identify the potential trade packages in which the 10 or more items would be procured - Identify project level environmental and social procurement project-level objectives reflecting the risks and opportunities assessment; - Outline mitigation principles and standards - Establish clear governance structures to ensure implementation of the plan including roles and responsibilities for implementation and monitoring of all procurement and contracts; and - Outline requirements for data collection and impact measurement monitoring and reporting - Provide a framework for incentivising the achievement of the plan with relevant contractors and trades	**Responsible procurement plan**	The project must develop and implement a **Responsible Procurement Plan** to mitigate and manage identified risks and drive implementation of identified opportunities. This can be part of an organisational plan or a stand-alone plan, requirements are listed in the guideline. Contracts must require data collection, monitoring and reporting; and a framework for incentivising the achievement of plan.

Green Star Strategy

#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
6	Responsible structure	CA	80% of all structural components by cost must meet the relevant sustainability attributes score of at least 10.	3		3			Design	Structure	AECOM	80% of all structural components by cost must meet the relevant sustainability attributes score of at least 10. Scores for each product can be calculated by using the Responsible Products Value table. Recognised initiatives that are present in the Responsible Products Value (RPV) table are: - Industry specific environmental product declarations (EPD); - Product specific environmental product declarations (EPD); - ISO14001 certification; - Climate Active Carbon Neutral Certification; - Chain of custody certification; and - Third-party product certification schemes. Elements that serve a dual purpose (e.g. load bearing façade) can be claimed in this and other credits.	**Receipts** confirming purchase of stated products **Evidence that claimed products constitute 80% of all structural components** (the evidence can be a signed/approved Product Register by head contractor using GBCA Responsible Products Value table as a reference, calculation guidance provided in the Building Submission Guideline).	FSC Certification GECA Stell and Products GreenRate Level A Reused product of building components
		EP	In addition to the Credit Achievement, one of the following is met: 10% of all products in the structure by cost each have a score of at least 15 or 30% of all products in the structure by cost have an average score of at least 12	2				2	Design	Structure	AECOM	10% of all products in the structure by cost each have a score of at least 15 or 30% of all products in the structure by cost have an average score of at least 12	**Calculation** to demonstrate compliance	As above.
7	Responsible envelope	CA	60% of all components in the building envelope by cost must meet the relevant sustainability attributes score of 10.	2			2		Design	Structure / Facades	AECOM	The envelope is defined as the elements that surround a building such as the façade, and all façade components such as external shading and insulation, suspended slabs, as well as roofing systems. Scores for each product can be calculated by using the Responsible Products Value table.	**Receipts** confirming purchase of stated products **Evidence that claimed products constitute 60% of all building envelope components** (the evidence can be a signed/approved Product Register by head contractor using GBCA Responsible Products Value table as a reference, calculation guidance provided in the Building Submission Guideline).	FSC Certification GECA Panel boards (PB v3.0-2021) GECA Steel and Steel Products (SSP v1.0i-2019) GreenRate Level A
		EP	10% of all products in the building envelope by cost each have a score of at least 15 or 25% of all products in the building envelope (by cost) have an average Responsible Products Value score of at least 12	2					Design	Structure / Facades	AECOM	In addition to the Credit Achievement, one of the following is met: 10% of all products in the building envelope (by cost) each have a score of at least 15 or 25% of all products in the building envelope (by cost) have an average Responsible Products Value score of at least 12	**Calculation** to demonstrate compliance	
8	Responsible systems	CA	20% of all active building systems by cost meet score of at least 6.	1		1			Design	Services	AECOM	Active building systems are characterised by energy and movement, and include all mechanical, hydraulic, transportation and electrical systems present in the building. Lighting, security, and fire systems are also included. Products that make up active systems such as pipes, cables, ducts etc are included. Passive systems such as a façade shading device are not included. Scores for each product can be calculated by using the Responsible Products Value table.	**Receipts** confirming purchase of stated products **Evidence that claimed products constitute 20% of all building systems** (the evidence can be a signed/approved Product Register by head contractor using GBCA Responsible Products Value table as a reference, calculation guidance provided in the Building Submission Guideline).	EPDs for cabling, and duct work, plus recycled content for other materials. Early communication with the contractor/designer is required.
		EP	In addition to the Credit Achievement, one of the following is met: 5% of all active building systems (by cost) meet a Responsible Products Value score of at least 11 or 15% of all active building systems (by cost) have an average Responsible Products Value score of at least 8.	1				1	Design	Services	AECOM	As above.	**Calculation** to demonstrate compliance	Stretch target
9	Responsible finishes	CA	60% of all internal building finishes (by cost) meet a Responsible Products Value score of at least 7	1		1			Design	Architect / Finishes	AECOM	Internal finishes include flooring, plasterboard, paints, ceilings, partitions, doors, internal windows or similar. Scores for each product can be calculated by using the Responsible Products Value table.	**Receipts** confirming purchase of stated products **Evidence that claimed products constitute 60% of al internal finishes** (the evidence can be a signed/approved Product Register by head contractor using GBCA Responsible Products Value table as a reference, calculation guidance provided in the Building Submission Guideline).	Climate Active Carbon Neutral FSC certification GECA Adhesives, Fillers and Sealants (AFS v4.0ii-2014) GECA Carpets (C v3.0-2021)GECA Floor Coverings (FC v3.0-2021) GECA Furniture and Fittings (FF v3.1i-2017) GECA Furniture, Fittings, Foam and Mattresses (FFFM v3.1i-2017) GECA Paints and Coatings (PC v2.3i-2012) GECA Panel Boards (PB v3.0-2021) GreenRate Level A
		EP	10% of all products in all internal finishes by area each have a score of at least 12 or 20% of all internal building finishes (by cost) have an average Responsible Products Value score of at least 9	1				1	Design	Architect / Finishes	AECOM	In addition to the Credit Achievement, one of the following is met: 10% of all products in all internal finishes by area each have a score of at least 12 or 20% of all internal building finishes (by area) have an average Responsible Products Value score of at least 9	**Calculation** to demonstrate compliance	Stretch target
	SUB-TOTAL			**17**	**3**	**6**	**2**	**4**						

Green Star Strategy

#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
	HEALTHY													
10	Clean air	ME	Ventilation system attributes	Mandatory						Mechanical	Contractor	The building ventilation systems must be designed to comply with ASHRAE Standard 62.1:2013 or AS 1668:2012 (whichever is greater) regarding minimum separation distances between pollution sources and outdoor air intakes. All new and existing ductwork that serves the building must be cleaned prior to occupation in accordance with a recognised Standard.	**Mechanical drawings** for each ventilated space **Extract from the ventilation system specification** for each system **Extracts from the Environmental Management Plan** that specify ventilation cleaning **Extract from the Commissioning Report** demonstrating that the HVAC and CO2 monitoring systems are operating as intended. For naturally ventilated areas, this is only relevant where automation systems and the like are included	Cleaning of ductwork not in generic GC21 head contract. To be written into mechanical specification
		ME	Provision of outdoor air (50% improvement) or CO2 levels maintained	Mandatory						Mechanical	SINSW	-Outdoor air must be provided to each space in the nominated area at a rate greater than the minimum required by AS 1668.2:2012 by 50%. Or -The system must be capable of providing enough outdoor air to maintain carbon dioxide (CO2) levels at, or less than 800ppm within each space in the nominated area, at all times during the design occupancy period.		
		ME	Exhaust or Elimination of Pollutants	Mandatory						Mechanical	SINSW	It must be demonstrated that pollutants from printing and photocopying equipment, cooking processes and equipment are limited from the nominated area by either: - Removing the source of pollutants; or - Exhausting the pollutants directly to the outside. For the first option, sources of pollutants, such as printing or photocopy equipment, kitchen stoves or vehicles, must be compliant with minimum emissions standards or not be present within the nominated area.		
		CA	Provision of outdoor air (100% improvement)	2					Design	Mechanical	SINSW	-Outdoor air must be provided to each space in the nominated area at a rate greater than the minimum required by AS 1668.2:2012 by 100%. Or -The system must be capable of providing enough outdoor air to maintain carbon dioxide (CO2) levels at, or less than 700ppm within each space in the nominated area, at all times during the design occupancy period.		Not targeted
11	Light quality	ME	Minimum Lighting Comfort (min)	Mandatory						Electrical	Architect	- All lighting must be flicker-free; - Light sources must have a minimum Colour Rendering Index (CRI) of 85 or higher - Light sources must meet best practice illuminance levels for each task within each space type with a maintained illuminance that meets the levels recommended in AS/NZS 1680.1:2006 series applicable to the project type and including maintenance; - The maintained Illuminance values must achieve a uniformity of no less than that specified in Table 3.2 of AS/NZS 1680.1:2006, with a maintenance factor method as defined in AS/NZS 1680.4.; and - All light sources must have a minimum of 3 MacAdam Ellipses (SDCM).	**Lighting Drawings** **Product Data Sheets** **Architectural Drawings** **Lighting Specifications/Schedules** **Lighting Calculation Result Summary** that clearly shows the calculated average lux level and uniformity for each space.	
		ME	Glare (reduction from light sources)	Mandatory						Electrical	Architect	Prescriptive method 1: Bare light sources must be fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants, including occupants looking directly upwards. Alternatively, for LED luminaires the Unified Glare Rating (UGR), as estimated from the manufacturers data sheets for a standard room, must not exceed the maximum values listed in Table 8.2 of AS/NZS 1680.1:2006. Prescriptive method 2: Where the nature of the tasks, layout and surface reflectance in a space are not known (e.g. shell and core) the lighting system must comply with the Luminaire selection system as detailed in Clause 8.3.4 of AS/NZS 1680.1:2006. Performance method: The Unified Glare Rating (UGR) calculated for the lighting on a representative floor must not exceed the maximum values listed in Table 8.2 of AS/NZS 1680.1:2006. The UGR rating must be calculated in accordance with the procedure outlined in Clause 8.3.3 of AS/NZS 1680.1:2006.	**Architectural Drawings** **Lighting Specifications/Schedules** Prescriptive Method: **Product Data Sheets that demonstrates** bare light sources must be fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles **OR Evidence** that shows compliance with the Luminaire selection system as detailed in Clause 8.3.4 of AS/NZS 1680.1:2006. Performance Method: **UGR calculation** that shows for the lighting on a representative floor not exceed the max. value listed in Table 8.2 of AS/NZS 1680.1:2006.	
		ME	Daylight	Mandatory						Architect	SINSW	This Minimum Expectation aims to ensure the building is providing daylight access to building occupants through solutions that exceed the typical relevant federal, state, or local regulations. The project team is required to show how the building's design: - Maximises the number of occupants that are in or near daylit areas during their daily activities for all building types; - Ensures regularly occupied spaces are in reasonable proximity to glazed façades, windows or skylights; - Controls or mitigates glare in the daylit spaces; - Maximises daylight to spaces that prioritise learning, healing, and living: - Provides building occupants with unrestricted access to daylit indoor common spaces.	**Daylight modelling report or manual calculations**	20% of area to be provided with high levels of daylight
		CA	Artificial lighting (Surface Illumination) or	2	2				Design	Electrical		This criterion applies to all regularly occupied areas in the building. Areas that are either transient or accessed intermittently such as corridors, storage, back of house or plant rooms can be excluded. Compliance is required to be demonstrated across 95% of the nominated area for this credit to be achieved. The artificial lighting solution must address the quality of light in the space, provide highlights and contrast, and seek to avoid excessive lighting or overly uniform solutions. -The walls within the field of view of occupants in regularly occupied spaces must have an average surface reflectance value of 0.70 and an average surface illuminance of at least 50% of the horizontal illuminance levels required for task. This requirement does not apply to green walls or to coloured/patterned/biophilic feature walls that make up less than 20% of the field of view of the occupants; and - Vertical illuminance in workspaces: ensure that 50% of the horizontal task illuminance reaches the average eye height for 90% of primary spaces using vertical illuminance calculation grid.	**Architectural Drawings** **Lighting Specifications/Schedules** **Isolux Plot Drawings**	Not targeted
		CA	Daylight						Design	AECOM		For non-residential buildings, at least 40% of the principle averaged across the building must receive high levels of daylight with no less than 20% on any floor or tenancy (whichever is smaller). For residential buildings, 60% of the combined living and bedroom area of each apartment unit must comply with the daylight requirements. Kitchens are not included in the calculations. The daylight levels must also be present in at least 20% of the area of each bedroom and living area. Manual calculations: Calculations must comply with the GBCA's Green Star Daylight and Views Hand Calculation Guide. Daylight autonomy: High Levels of daylight are deemed to have at least 160 lux due to daylight during 80% of the nominated hours. Blinds are to be able to be controlled by occupancy and must have a visual light transmittance (VLT) of ≤ 10%.	**Daylight modelling report or manual calculations**	Greater than 40% of area is provided with high levels of daylight. Upper levels have Clerestory windows to provide compliance with this credit criteria.
		EP	Achieves both Credit achievements criteria	2										Double credits are provided if both CA (Credit Achievement) are achieved under Light Quality.

Green Star Strategy

	#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
Healthy	12	Acoustic Comfort	ME	Acoustic Comfort Strategy	Mandatory						Acoustics	Architect	An Acoustic Comfort Strategy must be prepared describing how the building design will deliver acoustic comfort to the building occupants. The following Acoustic Comfort criteria are to be addressed: - Quiet enjoyment of space; - Functional use of space; - Control of intrusive or high levels of noise; - Privacy; - Noise Transfer; and - Speech intelligibility.	**Acoustic Comfort strategy**	An **Acoustic Comfort Strategy** must be prepared describing how the building design will deliver acoustic comfort to the building occupants. Credit criteria listed in the new guideline.
			CA	Maximum internal noise levels and/or;	2	2				Design / Post PC	Acoustics		Internal ambient noise levels in the regularly occupied areas must be no greater than the upper range value relevant to the activity type in each space as recommended in the current AS/NZS 2107:2016.	**Detailed Drawings detailing the acoustic design** features relevant to all of the CA credit **Report by a qualified acoustics consultant** confirming credit compliance **Extracts from the commissioning report** detailing relevant measured noise levels and target noise levels	Business as usual. **3/5 to achieve credits**
			CA	Minimum internal noise Levels and/or;						Design / Post PC	Acoustics		Internal ambient noise levels in the regularly occupied areas must be no less than 5 dB below the lower range value relevant to the activity type in each space as recommended in the current AS/NZS 2107:2016.		Business as usual. **3/5 to achieve credits**
			CA	Acoustic separation and/or;						Design / Post PC	Acoustics		The sound insulation between internal spaces complies with: Dw + LAeqT > X. or; The partition between the spaces should be constructed to achieve a weighted sound reduction index (dB Rw) of: - At least 45; for all partitions separating enclosed spaces which are fixed without a door and/or glazed partitions without a door - At least 40, for all partitions fronting a room (from an open plan area); - At least 35 (in composite with door and partition) for all partition types that contain a door; and - At least 50 through floors between occupied spaces		The project must address noise transmission between enclosed spaces within the nominated area through privacy and sound insulation. **3/5 to achieve credits**
			CA	Impact noise transfer and/or;						Design / Post PC	Acoustics		Impact noise transfer measured in accordance with ISO 16283-2 through a floor where: - Floors are located above nominated areas; or - Adjacent spaces belonging to different tenancies which share a floor must not exceed dB LnT,w: – 55 for floors above residential accommodation spaces – 60 for all other spaces		Impact noise transfer measured in accordance with ISO 16283-2 through a floor where floors are located above nominated areas **3/5 to achieve credits**
			CA	Reverberation and/or;						Design / Post PC	Acoustics		The reverberation time in the nominated area must be not exceed the maximum for the intended use recommended in AS/NZS2107. This criterion does not apply to residential spaces.		Business as usual. **3/5 to achieve credits**
	13	Exposure to toxins	ME	Paints, adhesive, sealants, carpets low Voc	Mandatory						Architect	Contractor	At least 95% of internally applied paints, adhesives, sealants (by volume) and carpets (by area) must meet stipulated 'Total Volatile Organic Compounds (TVOC) Limits' below. Compliance can be demonstrated in the following ways: - The product(s) are certified under a recognised Product Certification Scheme. The certificate must be current at the time of purchase; - The product(s) are tested in a laboratory; or - There are no paints, adhesives, sealants and carpets in the building at practical completion.	**Extracts from contract specifications** for adhesives and sealants and demonstrate emission levels **Safety Data Sheets** that demonstrate the compliant emission levels **Product VOC test certificates** that demonstrate the compliant emission levels **Product certificates** that demonstrate certification under a recognised product certification scheme or recognised standard Invoices and proof of purchase to demonstrate costs of compliant materials **Bill of Quantities** from Quantity Surveyor or Cost planner, demonstrating material costs	Interior wall and ceiling paint <16 g/L TVOC, General Purpose Sealants <50 g/L, Primers sealers and prep coats <65 g/L Acoustic sealants, waterproof membranes and fire retardant sealants and adhesives <250 g/L. The EFSG require low VOC and formaldehyde content in line with Green Star requirements.
			ME	Engineered wood low formaldehyde	Mandatory						Architect	Contractor	Either no new engineered wood products are used in the building, or at least 95% (by area) of all engineered wood products meet specified formaldehyde emission limits, as per the following page. Where there are engineered wood products, compliance to emission limits can be demonstrated in two ways: - The product(s) are certified under a recognised Product Certification Scheme. The certificate must be current at the time of purchase; and/or - The product(s) are tested in a laboratory.	**Specifications** that demonstrate formaldehyde contents **Safety Data Sheets** that demonstrate the formaldehyde content **Product VOC test certificates** that demonstrate formaldehyde contents **Product certificates** that demonstrate certification under a recognised product certification scheme or recognised standard Invoices and proof of purchase to demonstrate costs of compliant materials **Bill of Quantities** from Quantity Surveyor or Cost planner, demonstrating material costs	
			ME	No Lead, asbestos, PCBs	Mandatory						SINSW	Contractor	A comprehensive hazardous materials survey must be carried out on any existing buildings or structures on the project site, in accordance with the relevant Environmental and Occupational Health and Safety (OH&S) legislation. Where the survey identified asbestos, lead or PCBs in any existing buildings or structures, the materials must be stabilised, or removed and disposed of in accordance with best practice guidelines; or the survey concluded that no hazardous materials were found in any existing buildings or structures on the project site.	**Hazardous materials survey** must be carried out on any existing buildings or structures on the project site	

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#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Responsibility: Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
		CA	On site VOC and formaldehyde testing	2			2		Design / Post PC	SINSW	AECOM	Onsite test meeting following limits: TVOC = 0.27ppm; Formaldehyde = 0.02ppm. Sample testing every 40m2. Testing must take place after practical completion and prior to occupants moving into the building.	**On-site VOC test results** **As built drawings** showing the location of the test samples	
14	Amenity and comfort	CA	The building has dedicated amenity rooms to act as a parent room, relaxation room, or an exercise room	2				2	Design	Architect		The building includes one or several rooms designed to promote either inclusivity, mindfulness or exercise for staff or occupants. For a room(s) to qualify, it must be classified as per below: - Parent room. - Relaxation, meditation, or prayer room. - Exercise room. The room size to be provided must be as follows: - The size of the room is calculated at a ratio of 1m² per every 10 occupants or staff; and - The room must be no smaller than 10m2.	A **narrative describing the various rooms** **As build drawings** showing the location and size of the rooms **Evidence** that all necessary equipment for the room type has been provided **Evidence** that the rooms comply with the Light Quality and Acoustic Comfort credits **Evidence** that the room complies with the 'Equal access to the building' criterion of the *Design for Inclusion* credit (PEOPLE)	TBC
15	Connection to nature	CA	Views	1					Design	Architect	AECOM	At least 60% of primary spaces occupied for more than two hours must have a clear line of sight to a high quality internal or external view. All floor areas within 8m from a compliant view meet this credit criterion.	**Drawings showing access to views** and/or line-of-site showing that no obstructions exist	
		CA	Plants						Design	Architect		Indoor plants must be provided in the nominated spaces. One or more plants in pots with a soil surface area totalling at least 500cm² for every 15m² of the primary spaces is required. An ongoing maintenance plan must be established to ensure plant health is maintained. The contract must include: - A 2-year contract with a plant maintenance contractor to enact the plan; - A schedule of plants within the nominated space; - Service intervals; - Policy regarding the maintenance of soil moisture, pH and nutrients; - Diseased plant replacement policy; and - Cleaning requirements and commitments.	**As build drawings** showing the location of plants in the space **Extracts from the ongoing management plan for plants**	
		CA	Nature-inspired design						Design	Architect	AECOM	Five additional nature-inspired design interventions must be provided in alignment with the following principles: - Elements that provide differing natural sensory experiences; - Elements that reflect natural and cultural patterns and forms; - Using natural materials; and - Natural motifs and art.	**Narrative of the five nature-inspired design features**, along with evidence to support claims	
		EP	Interactive Nature	1					Design	Architect	AECOM	Occupants can interact with nature either inside the building, or externally through a green wall or roof garden. At least 5% of the building's floor area/ or site area (whichever is greater) must be allocated to this opportunity.	**Evidence of how occupants can interact with nature** (e.g. site plans showing green roofs)	
	SUB-TOTAL			**14**	**4**	**0**	**2**	**2**						

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	#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
Resilient		**RESILIENT**													
	16	Climate change resilience	ME	Climate risk pre-screening checklist	Mandatory					ESD	All Services		Project team members must consider potential impacts from climate change when completing the checklist including, but not limited to: - Direct damage or failure of project components; - Accelerated deterioration of project components or reduced design life; - Reduced operating capacity; - Climate hazard impacts to surrounding areas (e.g. impacting access and egress); - Impacts to the health and wellbeing of building occupants and other relevant stakeholders; and - Indirect risks from impacts to other interdependent systems and services (e.g. transport networks, power, water, telecommunications).	**Signed off Climate Change Checklist**, by a member of the project leadership team and shared with key project stakeholders, including the client/building owner.	Has been completed as part of the Climate risk workshop
			CA	Climate change risk and adaptation assessment	1	1				Early Design	AECOM		A suitably qualified professional must undertake a climate change risk and adaptation assessment and author a report. The assessment must - Aligns with the Australian Standard AS 5334:2013 Climate change adaptation for settlements and infrastructure; and - Follow the principles of risk management outlined in the Australian and New Zealand Standard AS/NZ ISO 31000:2009 Risk Management.	**CAP/Resilience Plan to include below:** **Climate change risk assessment** **Risk assessment criteria**, including the likelihood and consequence tables, risk matrix, RCP and timescale, and any assumptions significant in the development of the assessment **Details of the adaptation responses** **Evidence the assessment was communicated to design leads** **Project risk register**, highlighting the 'high' (addressed through design or future operational responses) and 'extreme' (addressed through specific design responses) identified climate change risks.	AECOM are developing
			CA	Managing risks (and design responses)						Early Design	AECOM		The project team must ensure risks are addressed as follows: - All risks rated as 'Extreme' must be addressed through specific design responses; - All risks rated as 'High' must be addressed through design or future operational responses; and - Regardless or risk rating, at least two risks identified in the assessment must be addressed by specific design responses.	**High and extreme project risks,** 'high' (addressed through design or future operational responses) and 'extreme' (addressed through specific design responses) identified climate change risks. **(AB) Drawings and specifications** demonstrating design responses to the Climate Adaptation Plan/Resilience Plan **Commissioning Report or other technical document** demonstrating design responses to the Climate Adaptation Plan/Resilience Plan	To be incorporated into the design
	17	Operation resilience	CA	Comprehensive Risk Assessment	2	2				Design	AECOM		A suitably qualified professional must undertake an operational resliation assessment and author a report. for the following Shocks - Failure of critical infrastructure (power, water and digital); - Health pandemic; - Water security; - Geological hazards (landslides, earthquakes, tsunamis); and - Direct attack (cyber and physical) Stresses - Ageing infrastructure; - Rising cyber dependency; - Increasing energy costs; and - Lack of transport accessibility and availability	**CAP/Resilience Plan to include below:** **Operations resilience assessment** **Details of how shocks and stresses have been assessed** **Risk assessment criteria**, including the likelihood and consequence tables, and any assumptions significant in the development of the assessment	AECOM are developing
			CA	Managing risks						Design	AECOM		The project team must ensure risks are addressed as follows: - All risks rated as 'Extreme' must be addressed through specific design responses; - All risks rated as 'High' must be addressed through design or future operational responses; and - Regardless or risk rating, at least two risks identified in the assessment must be addressed by specific design responses.	**Details of the adaptation responses**	High and extreme risks must be addressed through specific design responses.
			CA	Address power loss						Design	Services	AECOM	The project team must perform an assessment of the building's survivability in the case of a blackout. The building must then be designed to account for its design purpose and provide a measure of survivability for the likely occupants.	**Assessment of the building's survivability** during a blackout with design responses	Refer to Climate adaptation and operational resilience risk report
	18	Community resilience	CA	Review of key vulnerabilities within the community it is located and take steps to build community resilience through external consultation	1					Design	AECOM		Identifies shocks and stresses that impact the building's ability to service the community, and develops responses to manage these. The project team must undertake at least one community capacity building activity prior to or during construction. A suitably qualified professional must author the community resilience plan.	**Community resilience plan** **Overview of the community capacity building activity**	Not targeted
	19	Heat resilience	CA	Design responses to mitigate urban heat island.	1		1			Design	Architect		At least 75% of the whole site area comprises of one or a combination of strategies that reduce the heat island effect - Vegetation; - Green roofs; - Roofing materials, including shading structures, having the following: - For roof pitched <15°– a three-year SRI of minimum 64; or - For roof pitched >15°– a three-year SRI of minimum 34. - Unshaded hard-scaping elements with a three-year SRI of minimum 34 or an initial SRI of minimum 39; - Hardscaping elements shaded by overhanging vegetation; and - Water bodies and/or water courses.	**Site Plan highlighting all relevant areas** as referenced within the area schedule **Area Schedule listing the areas** of each of the relevant site elements and where relevant, the SRI values and referencing plan drawings for the site **Supplier Documentation material data sheet** for compliant roofing and hardscape materials	
	20	Grid resilience **(Meets one or several of peak demand reduction; demand responds and passive design solution)**	CA	Active generation and storage systems	3		3			Design	AECOM	Architect	The building has the capacity to reduce its electricity peak demand by 10% of the building's annual peak electricity demand for at least a one-hour period. The peak demand reduction can occur through thermal storage solutions (such as chilled water storage systems), by electricity storage solutions (batteries), demand response, or through renewable on-site generation.	**Energy model/report** demonstrating the buildings peak energy demand **Description** of active generation or storage systems or technologies **Overview** of the buildings **BMS** **Evidence** of approval with utility provider OR evidence that no more that 30% of generated electricity is exported	
			CA	Demand response						Design	AECOM	Architect	The demand response strategy must show how at least 10% of the building's annual peak electricity demand is being shed without affecting occupant amenity (comfort, lighting, movement) as outlined in credits Light Quality and Amenity and Comfort for at least 4 hours.	**Description** of the plan or infrastructure to manage demand response **Evidence** that the system has been implemented into building commissioning processes and tested	
			CA	Passive design solutions						Design	AECOM	Architect	For this criterion to be awarded, the building must achieve the below: - The building's facade demonstrates a 10% improvement over a reference building modelled to Section J requirements of the National Construction Code 2019, or the version of the code applicable to the building's construction, whichever is later. The calculation must follow either Method 2 in the wall/glazing calculator or use a JV3 model; and - The building is mostly naturally ventilated (that is, the building has no mechanical cooling or heating for 80% of the building's occupiable area); and - The building's occupiable area is less than 3,000sqm.	**Energy model/report** showing the building's façade demonstrate a 10% improvement over reference buildings **Mechanism drawings or other** showing how the building is mostly naturally ventilated **As built drawings** showing the occupiable spaces	Not targeted
		SUB-TOTAL			**8**	**3**	**4**	**0**	**0**						

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	#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
		POSITIVE													
Positive	21	Upfront carbon emissions	ME	Reducing upfront carbon emissions **(10% lower than the reference building, demolition works are excluded from ME)**	Mandatory	ME					Structural	SINSW	The building's upfront carbon emissions reduction are 10% lower than a reference building through good design and material selection. Demolition works are excluded from the Minimum Expectation.	**Life Cycle Assessment report** (if pathway used) **GBCA Upfront Carbon Emissions Calculator** (if pathway used) **Bill of quantities** showing materials used **Documentation as per Life Cycle Impacts credit** (if pathway used)	40% of Portland cement content reduced in cement
			CA	Reducing upfront carbon emissions **(20% lower than the reference building)**	3		2			Design	AECOM	Architect / A+A	The building's upfront carbon emissions reduction are 20% lower than a reference building through good design and material selection. Demolition works are included in this scope. Minimum expectation for 6 Star buildings The building must also have a Climate Positive Pathway	**Life Cycle Assessment report** (if pathway used) **GBCA Upfront Carbon Emissions Calculator** (if pathway used) **Bill of quantities** showing materials used **Documentation as per Life Cycle Impacts credit** (if pathway used)	
			CA	Calculating upfront carbon emission reductions						Design	AECOM		Two calculation pathways: Life Cycle Impacts or GBCA Upfront Carbon Emission Calculator.		
			CA	Offsetting demolition works **(Modules A1 - A3 only)**						Demolition	SINSW	AECOM	Demolition works must be captured and offset. An embodied carbon calculation must be done for the demolished portion and these emissions offset.	**Embodied carbon calculation**	
			EP	Offsetting all remaining upfront carbon emissions **(A1 - A5)**	3					Design / Construction	SINSW	AECOM	In addition to meeting the Credit Achievement, the developer, applicant, or building owner must offset at least 40% of upfront a carbon emissions from Modules A1 – A5. Project teams seeking to achieve the Exceptional Performance must use the Life Cycle Assessment pathway.	**Evidence** to demonstrate offset of the all remaining upfront carbon emissions from Modules A1-A5 **(if targeting EP, project must go through Life Cycle Assessment)**	
	22	Energy use	ME	At least a 10% lower energy use than one built to the National Construction Code 2019.	Mandatory						Architect / Services	SINSW	Modelling to confirm 10% lower energy use compared to National Construction Code 2019. On-site renewable energy generation systems or battery storage systems, connected behind the meter cannot be used to calculate reduction in energy use for ME.	**Energy modelling report** **Extracts from specifications** **Extracts from commissioning reports** **As built drawings of the façade** **Evidence of renewable energy generation on-site** (e.g. contracts, as built drawings) **Schedule identifying all on-site storage systems** installed in the building	Mandatory to all GS ratings. Minimum ESFG requirements are 10% and project must achieve this
			CA	At least a 20% lower energy use than one built to the National Construction Code 2019.	3		3			Design	Architect / Services	SINSW	Modelling to confirm 20% lower energy use compared to National Construction Code 2019. On-site renewable energy generation systems or battery storage systems, connected behind the meter cannot be used to calculate reduction in energy use for CA. Minimum expectation for 6 Star buildings Climate Positive Pathway		Achieved with high performance HVAC, Electric heat pump DHW, 99.5 kW PV, and auto shutdown on vertical transport.
			EP	At least a 30% lower energy use than one built to the National Construction Code 2019.	3		3			Design	Architect / Services	SINSW	Modelling to confirm 30% lower energy use compared to National Construction Code 2019. On-site renewable energy generation systems or battery storage systems, connected behind the meter cannot be used to calculate reduction in energy use for EP.	If targeting, same as above	Achieved with high performance HVAC, Electric heat pump DHW, 99.5 kW PV, and auto shutdown on vertical transport.
	23	Energy Source	ME	Zero Carbon Action Plan	Mandatory						SINSW	ESD	Develop a Zero Carbon Action Plan for the building. The plan must be signed off by the building owner and included in any operational documents for the building.	**Zero Carbon Action Plan** with supporting evidence **Signed PPA** including extracts on the length of contract	Must develop a **Zero Carbon Action Plan** for the building. The plan must be signed off by the building owner and included in any operational documents for the building. AECOM can develop
			CA	100% of the building's electricity comes from renewable electricity.	3					Design	Services	AECOM	All electricity under the control of the building owner or operator must be accounted for and sourced from renewables. Electricity use for tenant loads is excluded from this credit (see Tenant Emissions). Both on-site and off-site renewables are acceptable. Where the credit is achieved through off-site renewables, the smallest length of contract to claim offsite electricity is 5 years.	**Evidence that the PPA or on-site generation** covers 100% of electricity or energy **Public commitment** to the Global Commitment for Net Zero Carbon Buildings managed by World GBC	
			EP	100% of the building's energy comes from renewables. No on-site fossil fuel.	3					Design	Services	AECOM	Fossil fuels cannot be used on site for any domestic hot water, space heating or cooking under any circumstances regardless of base build or tenant use. Fossil fuels for industrial processes are excluded from the assessment. Both on-site and off-site renewables are acceptable. Where the credit is achieved through off-site renewables, the smallest length of contract to claim offsite electricity is 5 years.	**If the claim is through off-site renewables:** **Signed renewable energy contract**, can be part of a corporate power purchasing agreement for a building portfolio, **OR** **Public commitment** to the Global Commitment for Net Zero Carbon Buildings managed by World GBC	

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24	Other carbon emissions	CA	Eliminate or offset refrigerants, the emissions must be offset at 100%	2	2				Design	Services		All refrigerants from building systems or domestic appliances provided by the building must be captured in the credit. This includes where fridges or freezers are provided as part of a fit out package in a residential setting. There are two pathways available: - Eliminates high-GWP refrigerants from the building; or - Offsets 100% of carbon emissions from refrigerants.	**Confirmation** that refrigerants have been eliminated from the building along with supporting documentation (e.g. mechanical as built drawings) **Calculations** showing the total refrigerant charge to be offset **Evidence** of purchase of offsets (e.g. contract) clearly showing the length of offset	Will require the offset of the initial charge of refrigerants
		EP	The building owner eliminates or offsets additional emissions not captured in the rest of the Positive category.	2					Design	Services	SINSW	This Exceptional Performance aims to address emissions that have not been addressed by claiming other credits. If other credits have been claimed, the emissions that are to be offset in this credit are lower. The emissions addressed in this credit are: - Emissions from the building's electricity use (as determined in the Energy Use credit) multiplied by the grid coefficient (unless the Energy Source Credit Achievement is met, in which case these emissions are zero); - Emissions from the building's energy use as determined in the Energy Use credit (unless the Energy Source Exceptional Performance is met, in which case these emissions are zero); - Upfront carbon emissions as determined in the Upfront carbon emissions credit (unless the Upfront Carbon Emissions is met, in which case these emissions are zero); - Life-cycle emissions from modules B and C as calculated in Life Cycle Impacts; - Emissions from construction equipment use, and utilities during construction on site; and - Construction waste emissions.	**Overview** of the remaining carbon emissions **Evidence** of their offset	Not targeted
25	Water use	ME	Install efficient water fixtures or 15% reduction vs reference	Mandatory						Architect	Hydraulic	There are two pathways for demonstrating compliance with this criterion: - Follow the prescriptive approach that describes fixture and appliance efficiency; or - Show a 15% reduction against a reference building through the GBCA's Potable Water Calculator	**Water Use** calculator **WELS certificates** **Drawing(s)** for each typical floor showing isolation valves for floor-by-floor testing of the fire sprinkler system, and drawings of the water storage and re-use system(s) **Drawing(s)** clearly showing the location of all heat rejection equipment installed on the project **Drawings** showing the landscape design and the irrigation system, listing the name, location, and plant species zone as it appears in the Calculator **Manufacturer's information** showing that the application efficiency for the landscape irrigation system **Manufacturer's information** including backwash volume and frequency of filter cleaning **Drawing(s)** of process cooling water usage loops	All sanitary fixtures have a minimum WELS rating listed: Taps 5 Star; Urinals 5 Star; Toilet 4 Star; Shower 3.5 Star; Washing Machines (if applicable) 4.5 Star; Dishwasher 5 Star (if applicable).
		CA	45% reduction vs reference	3	3				Design	AECOM	Architect / Services	Show a 45% reduction against a reference building through the GBCA's Potable Water Calculator		Rainwater tank is installed to collect and reuse rainwater to toilets. This system is also connected to the recycled non-potable water source. Landscape is designed with water-tolerant species and efficient irrigation system is installed (such as drip irrigation with moisture sensor override).
		EP	75% reduction vs reference	3		3			Design	AECOM	Services	Show a 75% reduction against a reference building through the GBCA's Potable Water Calculator		
26	Life Cycle Impacts	CA	LCA for material impacts	2					Design	AECOM	All	The reduction in life cycle impacts must be demonstrated through a whole-of-building, whole-of-life (cradle to grave) comparative Life Cycle Assessment (LCA), a 30% reduction in life cycle impacts when compared to standard practice is required.	**Life Cycle Impacts** calculator **LCA** Report **Peer Review Statement** **LCA practitioner competencies statement** OR **LCACP certificate for practitioner and peer reviewer** **Standard Practice Reference Building Documentation** **Actual Reference Building Documentation**	Not targeted
27	Sector Spec: Tenant Emissions	CA	All tenant energy consumption comes from renewables (available to tenanted buildings such as offices, industrial, and retail centres)	0										N/A for educational facility
28	Sector Spec: Commitment to Performance	CA	Tenants and building owners signed comprehensive green leases to address energy, waste, and indoor environment impacts, and to seek accreditation during operations. Available to tenanted buildings such as offices, industrial, and retail centres	0										N/A for educational facility
			SUB-TOTAL	**30**	**5**	**11**	**0**	**0**						

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		PLACES													
Places			ME	Changing facilities (including showers, lockers)	Mandatory						Architect	SINSW	The design of the shower facilities must be appropriate to encourage their use. The project team is expected to justify how their location, locker sizes, privacy requirements, and size meet this aim. All showers must be at least 900m x 900m to enhance usability. Showers and bathrooms provided to meet statutory accessibility requirements do not count towards the minimum showers required to meet this Minimum Expectation. One locker must be provided for every eight regular building occupants or staff. The lockers must be secure and located in the changing rooms.	**Transport Drawings** showing the provision and location of changing facilities **As built drawings** showing the number and size of showers, and of lockers **Site drawings or as built drawings** showing how the changing facilities are safe and protected	Class 3 and 9 buildings are required to comply for regular staff only, - 0 to 49 occupants - 1 unisex shower - 50 to 99 - 2 Showers - 100 to 200 - 4 Showers - 200+ 1 additional shower per every additional 200 people above 1 locker provided for every 8 staff members
			ME	Accessible, inclusive and located in a safe and protected place	Mandatory						Architect / Transport	SINSW	Upon accessing, pedestrians and cyclists must be protected from the elements and other vehicles. Access must be safe, with consideration given to avoiding steep gradients, surface grip levels and visibility around tight corners.		Occupants must be able to find the facilities thanks to clear signage throughout the building and access points.
	27	Movement and Place	CA	Bicycle Parking facilities	3				3	Design	Transport		The building's access must prioritise walking and cycling options. This means the building's access must be well lit, weather protected, and separated from vehicles. The building must also include access to cyclist facilities that are separated from the primary vehicle entrance to ensure safety.	**Sustainable transport Plan** including a site-specific transport assessment **Site plans** showing how pedestrian access has been prioritised **As build drawings** showing the number and location of cyclist facilities **Manual calculations** showing proximity to amenities	
			CA	Sustainable transport						Design	Transport		The project team must prepare and implement a Sustainable Transport Plan. The requirements or recommendations made in the Sustainable Transport Plan must then be reflected in the design of the building's facilities and ongoing operational processes. The building must include the following: - Car sharing parking spaces must include an electric vehicle connection, regardless whether the vehicles are electric at the time of practical completion; - Ready to charge EV charging points to at least 5% of all car parking spaces - Electrical infrastructure and a load management plan prepared to allow for future installation of EV charging to 25% of all car parking spaces (including the minimum 5% and car share spaces already provided) - A dedicated, safe, unobstructed route from the electrical supply point which allows for the future provision of all necessary electrical cabling without the need for substantial builders work in connection to the electrical cabling installation.		Sustainable Transport Plan has been developed by TTW. This site is undergoing a feasibility assessment for electric vehicle charging stations all though this is not targeted, this remains a stretch credit. Currently there are no proposed works to the Glenwood carpark
			CA	Reducing private vehicle use						Design	Transport		Using the inputs from the Sustainable Transport Plan to complete the GBCA Movement and Place Calculator the building's design and location must be shown to reduce emissions from transport, encourage mass transport use, and reduce vehicle kilometres travelled compared to a reference building. The changes must be as follows: - Emission reduction (40%); - Active mode encouragement (90%); and - Vehicle Kilometres Travelled (VKT) reduction (>20%)		
			CA	Encouraging walkability						Design	Transport		The building's design and location must encourage walking to and from a number of amenities. Roads within the building boundary should be designed to be low speed (10km/hr), pedestrians must have the right of way. The project will need to have at least 10 amenities across 5 categories within 400m radius of the building, as determined by the Movement and Place calculator.		
	28	Enjoyable places	CA	Publicly accessible spaces	2			2		Design	Architect	AECOM	The Building must: - Provide new publicly-accessible paces that are enjoyable and support community activity and interaction are provided. - Deliver an Activation Strategy to facilitate initiation of placemaking activities. All buildings except residential >1000 m2 - Communal space 0.25 m2/ occupant or 2.5% of GFA, whichever is greater	**Site plans** showing the size of public or communal spaces **Letter from the building owner** confirming the space is publicly accessible and may be used for free An **overview** of how the public or communal spaces comply with the requirements (e.g. flexible) A **narrative** of how the spaces have been designed for enjoyment	
			CA	Activation Strategy						Design	SINSW		An activation strategy must be provided to ensure placemaking continues after practical completion. The strategy must demonstrate how the future occupants and the wider community can contribute to the place activation	**Activation strategy**	
	29	Contribution to place	CA	Urban context report OR independent design review	2					Design	SINSW		Provide an Urban Context Report with urban context analysis and design response by a suitably qualified professional or; Independent Design Review to demonstrate the building's design contributes to the liveability of the wider urban context and enhances the public realm.	**<u>Urban Context Analysis</u>** **Extracts** from the urban context analysis, or various relevant reports that address requirements from this credit **As built or site drawings** showing how the building responds to the urban context report **Architectural drawings** showing the public realm interface design **OR** **<u>Design review panel</u>** **Evidence** to demonstrate that a design review process has been undertaken **Details** of the panel members and their experience relevant to this credit's requirements **A declaration from the project application** confirming that the design review panel meets the independency requirements	
	30	Culture, identity and heritage	CA	Community led design response OR independent design review	1		1			Design	SINSW		Must show that they have undertaken local analysis to identify culture, heritage and identity unique to the project site and area. must undertake Community Engagement as part of this local analysis. This can be achieved through: - Community art or placemaking projects; - Selection of suppliers/designers of artwork or cultural elements; - Building elements that tell stories of the past and heritage; and - Spaces and uses that reflect the local identities. OR If undertaking independent design review, design reviews needs to be held at key points in the development of the design. The Design review panel must be independent of the project. The design review must use comprehensive terms of reference during the project's design and design development phase.	**<u>Community led design responses</u>** **Culture, Heritage and Identity Report** outlining key findings of the local analysis and how community engagement activities influenced the design **As built drawings, site drawings, architectural drawings** showing how the culture, heritage and identity is incorporated into the buildings designs **OR** **<u>Design review panel</u>** **Evidence** to demonstrate that a design review process has been undertaken **Details of the panel members** and their experience relevant to this credit's requirements **A declaration from the project application** confirming that the design review panel meets the independency requirements	
				SUB-TOTAL	**5**	**0**	**1**	**2**	**3**						

Green Star Strategy

	#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
People		**PEOPLE**													
	31	Inclusive Construction Site	ME	Gender inclusive facilities and change amenities Gender inclusive fit-for-purpose Personal Protective Equipment (PPE)	Mandatory						Contractor		The following is provided on-site - Separate gender inclusive bathroom facilities and changing amenities with a high degree of privacy; and - Diverse gender-specific fit-for-purpose personal protective equipment (PPE) for diverse body sizes and types	**Description of the types of PPE** available to construction workers **Evidence of purchase of appropriate PPE**	
			ME	Social policies for discrimination, racism and bullying	Mandatory						Contractor		The head contractor must: - Implement policies to address issues of discrimination, racism, and bullying on-site; - Introduce on-site redress procedures for any relevant breaches, and corrective measures to be put in place should any incident be identified; - Empower a diverse lead team to manage these policies on-site, and - Provide training to all contractors and sub-contractors on these policies	**Extracts from relevant policies** that address discriminating, racism and bullying	
			ME	Training to 95% of all contractors and subcontractors present on site for at least three days	Mandatory						Contractor	0	The head contractor must provide the following training to 95% of all contractors and subcontractors present on site for at least three days: - Information on drug and alcohol awareness and mental health; and - Information on policies implemented on discrimination, racism, bullying on site, and safe ways to report poor behaviour	**Evidence of training materials** **Register of attendance**	
			CA	Needs analysis	1		1			Construction	Contractor		The responsible party should carry out a needs analysis of potential site workers and sub-contractors at tender (or similar early stage) to determine appropriate actions.	**Extracts of evidence** detailing the programs and policies implemented to promote health and wellbeing on site **Evidence** detailing the process to manage training, and track workers trained. Examples of evidence include extracts from the training policy, a report from a third-party provider, or similar	The programs or solutions can be implemented directly by the head contractor or through partnerships with mental and physical health organisations.
			CA	Physical and mental health impacts						Construction	Contractor		The head contractor must show that they have introduced programs and solutions to address at least five of the following: - Suicide prevention; - Healthy eating and active living; Reduce harmful alcohol and tobacco consumption and avoid drug use; - Increased social cohesion, community and cultural participation; - Understanding depression; - Preventing violence and injury; - Decreased psychological stress; and - Finding fulfilment at work or mindful meditation.	**Extracts of training** such as screenshots, presentation, or similar, showing the information provided as part of training	
			CA	Evaluating the program's effectiveness						Construction	Contractor		The project must provide an evaluation report to the client and sub-contractors with the following information: - Information on the programs or initiatives that were delivered, including information on dates, attendance, and available languages; and - A review on whether the programs delivered the intended outcomes including recommendations for improving future delivery of these programs.	**Evaluation report** of the effectiveness of the training	
	32	Indigenous Inclusion	CA	Reconciliation Action Plan OR Inclusion of indigenous design.	2	2				Design	SINSW		Reconciliation Action Plan (RAP) - A key member of the Project Team is part of the organisational RAP Working Group; - At least 90% of the RAP targets have been met on the project; and - All implemented actions related to the RAP are publicly reported on the Project's website. Or; The project team must demonstrate that the Australian Indigenous Design Charter guiding principles are incorporated in the design of the building including: - How local Aboriginal and Torres Strait Islander communities have been engaged throughout the design development; - How the project has been designed to acknowledge and recognise the Indigenous culture of the site; - How information on the reconciliation and cultural values of the project will be made available to the public, visitors and building tenants in the operational phase of the project's life.	**<u>Reconciliation Action Plan (RAP)</u>** **Extract from the Reconciliation Australia website** demonstrating that the project's RAP is endorsed by Reconciliation Australia **Extracts from the organisation's Annual Report or website** (or similar) demonstrating that the RAP is publicly reported upon **Reconciliation Action Plan Report (or similar)** on the outcomes from the project's RAP demonstrating that at least 90% of the RAP targets have been met in the first reporting cycle **Evidence** that a key member of the project team is also on the RAP working group **OR** **<u>Inclusion of Indigenous Design</u>** **Extract from indigenous engagement strategy** **Evidence of Aboriginal and Torres Strait Islander engagement** from concept design throughout the project's life cycle **As built drawings or photographic evidence** of incorporated designs **Evidence of information being made available to public** (e.g. website **Comparison against the four principles** from the Australian Indigenous Design Charter	The Department of Education has a RAP in place which has been accepted by the GBCA in a technical question for
	33	Procurement & Workforce Inclusion	CA	Social procurement strategy	2					Tender/ Construction	SINSW	AECOM / Architect	At least 2% of the building's total contract value has been directed to generate employment opportunities for disadvantaged and under-represented groups. This can be achieved directly through workforce targets or indirectly through social procurement. Develop a social procurement strategy including: - A description of the project's social procurement and workforce objectives, needs, and targets; - A demographic study of the local region to inform identification of target workforce groups and their skills; - Descriptions of the roles and responsibilities in the implementation and monitoring of social procurement and workforce targets and contracts; - Data collection and reporting templates / tools, including how data from Tier 2 and Tier 3 contractors will be collected; - Monitoring and reporting requirements; and - Reporting requirements for the project director. Generation of employment opportunities for disadvantaged and under-represented groups can be achieved either: - Directly, through workforce targets - Indirectly, through social procurement	**Social Procurement Plan** **Evidence of workforce targets** in main contracts and sub-contracts **Evidence of social procurement targets** in main contracts and sub-contracts **Evidence** that enterprises are independently certified by third party organisation	
			EP	Social procurement strategy (at least 4% of the building's total contract value has been directed to generate employment opportunities for disadvantaged and under-represented groups)	1					Tender/ Construction	SINSW	AECOM / Architect	At least 4% of the building's total contract value has been directed to generate employment opportunities for disadvantaged and under-represented groups. As Above	**If targeting, evidence same as above.**	
	34	Design for Inclusion	CA	The building is designed and constructed to be inclusive to a diverse range of people with different needs	2	2				Design	Architect		The building's design and construction must be able to be navigated and enjoyed by stakeholders of diverse ages, genders, and abilities (for example physical, sight, sound, mind, spectrum). This applies to common spaces, bathroom facilities and amenities provided within the building. This must include: - Equal access to the building: Provide equitable, appealing, safe, and secure access in a manner that does not segregate or stigmatise users through all principal entrance points and main thoroughfares inside and outside the building; - Diverse wayfinding: Introduce visual, physical, olfactory, and auditory solutions to help individuals navigate the site in a safe and enjoyable manner; and - Inclusive spaces: Introduce internal and external spaces for a diverse range of users, including parents, family restrooms, emergency rooms, quiet rooms and social interaction rooms. These rooms must be accessible to all users.	**As build drawings** showing equal access to the building **Evidence of diverse wayfinding**, including photographs As build drawings showing inclusive spaces	
			EP	Engagement with target groups has informed the inclusive design	1				1	Design	SINSW		A Needs Analysis is conducted, meeting the following requirements: - The project team must consult with distinct community types to develop a needs analysis that will influence the project during the design phase - Consultation must be undertaken early in the design process and include a balanced cross-section of representation of the target group - Consultation must be considerate and relevant to the project - The consultation process must generate a report that is then used to influence the design of the project As a result of the needs analysis, the building must show how it aligns with best practice guidelines, such as the Design for Dignity Guidelines: Principles for Beyond Compliance Accessibility in Urban Regeneration.	**Extract from consultation plan** with disability community **Evidence, through as built drawings or photographs**, of how the outcomes of the consultation have been incorporated into the buildings design **Analysis of the building's designs against the Design for Dignity Guidelines**: Principals for Beyond Compliance Accessibility in Urban Regeneration or other best practice guidelines	SINSW to confirm if this could be done.
		SUB-TOTAL			**9**	**4**	**1**	**0**	**1**						

Green Star Strategy

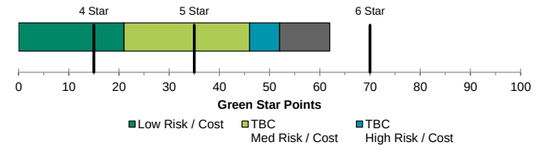
#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
NATURE														
35	Impacts to nature	ME	The building was not built on, or significantly impacted, a site with a high ecological value.	Mandatory						SINSW	Contractor	At the date of purchase or option contract, the building, infrastructure, or construction works do not clear: Old-growth forest, - Prime agricultural land, - Any wetland listed as being of 'High National Importance', - Aspects considered 'Matters of National Significance' listed under the Environmental Protection and Biodiversity Conservation Act (1999) regardless of whether they have been referred to the Federal Environmental Minister for consideration and assessed as a 'controlled action' or not. If the project site is adjacent to the above, or within 100 meters, or the site contains the above and these are being protected, the construction and future operations of the site takes measures to reduce their impact to the above as follows: – Both the Waterways Protection Credit Achievement and the Credit Achievement for this credit is met, and – The light pollution impacts are managed, and – Where the site is next to a wetland (as above), by also putting in place Wetland Protection Measures	**Extracts from the Development Application** **Zoning Plans**	**Ecological Assessment Report** is recommended to demonstrate credit compliance and for GS submission.
		ME	Managing light pollution impacts	Mandatory						Electrical	Architect	Light pollution to neighbouring bodies: the project must demonstrate that all outdoor lighting on the project complies with AS 4282:1997 Control of the obtrusive effects of outdoor lighting. Light pollution to night sky: It must be demonstrated that ULOR (no external luminaire on the project has a ULOR that exceeds 5%) or direct illuminance reductions in light pollution has been achieved by the project.	**As Built drawings** indicating the location of all external luminaires and showing the aiming point and mounting orientation of all external luminaires **Luminaire schedule for all external lighting**, nominating the type, lighting distribution and quantity of each luminaire and including the relevant photometric data such as ULOR **Calculation Plots** for all external lighting, showing that all grid points on the calculation plane return compliant Lux values **Excerpt from lighting control system**, **or similar**, demonstrating automatic deactivation of lights, based on external lux levels, where deactivation is required to achieve compliance	
		ME	Wetland management plan	Mandatory						SINSW	Contractor	Wetland Management Plan must be prepared by a qualified Ecologist or other qualified professional and include requirements for ongoing quarterly monitoring, annual reporting and management of the wetland ecosystem for a minimum of five years.	**Wetland Management Plan** **Evidence as per Waterway Protection credit**	TBC if there is a nearby wetland
		CA	The building's design and construction conserves existing natural soil, hydrological flows and vegetation elements and	2					Design	Civil	Landscape	The building's design and construction conserves existing natural soil, hydrological flows, and vegetation elements. If deemed necessary by an Ecologist, at least 50% of existing site with high biodiversity value is retained.	**Ecological assessment report** **Narrative from Ecologist** to show that 50% of the site has been retained **As built drawings** to show that 50% of the site has been retained	
36	Biodiversity enhancement	CA	Landscape area	2	2				Design	Landscape	Architect	At a minimum, external landscape in the building, whether horizontal or vertical must be provided at a ratio of either 15% of the site area or at a ratio of 1:500 of the GFA, whichever is larger. Vertical or horizontal landscapes are acceptable.	**Site Plans** marked up with landscaping **Aerial Site Photographs** marked up with landscaping	
		CA	Diversity of species						Design	Landscape	Architect	Landscape must be shown to be diverse and include multiple species/genus/etc. Greater than 60% of plants must be indigenous and the site must include at least one significant (nesting) tree or equivalent habitat provision per 500m² of landscaped area. Prescriptive Pathway - 10% plant species; - 20% plant genus; and - 30% plant family Performance Pathway An ecologist must assess and verify that the choice of landscaping and biodiversity is diverse and resilient to climate change impacts, thereby increasing the longevity of the landscape.	If Ecologist appointed, **confirmation from Ecologist** to show no invasive species; diverse landscaping; climate-resilient landscaping. If no Ecologist appointed, **evidence of plant diversity** (species, genus and family)	
		CA	Biodiversity management plan						Design	SINSW		A suitably qualified professional, such as a qualified ecologist or landscape architect is to prepare a Biodiversity Plan with key actions to maintain the ecological integrity or biodiversity of the site.	**Biodiversity Management Plan**	
		EP	Landscape area	2		2			Design	Landscape	Architect	As a minimum, external landscape in the building, whether horizontal or vertical must be provided at a ratio of either 30% of the site area or at a ratio of 1:300 of GFA, whichever is larger. Vertical or horizontal landscapes are acceptable.	**Site Plans** marked up with landscaping **Aerial Site Photographs** marked up with landscaping **Biodiversity Management Plan** **Ecologist report on:** Landscaping diversity and resiliency; No invasive species; How the site supports vulnerable ecosystems.	
		EP	Diversity of species						Design	Landscape	Architect	An ecologist must review, assess and verify how the choice of landscaping and biodiversity is diverse and resilient to climate change impacts, thereby increasing the longevity of the landscape. Greater than 80% of plants must be indigenous and the site must include at least one significant (nesting) tree or equivalent habitat provision per 250m² of landscaped area. No invasive species are allowed		
37	Nature connectivity	CA	Landscaping OR infrastructure for site connectivity	2					Design	Architect		Landscaping: Where connectivity is being achieved through landscaping, this must be contiguous with existing, restored and new habitats. As a minimum requirement for habitat connectedness, the conservation area must make up at least 25% of the total external area within the building's site boundary. To be eligible, this must be at least 182m²; or Infrastructure: Design features such as a canopy bridge, wildlife tunnels, green roofs, amphibian tunnels and green infrastructure are used to connect nature on site to adjacent natural areas, which are either existing, restored or new.	**Site Plans** marked up with landscaping, showing it is contiguous **Aerial Site Photographs** marked up with landscaping, showing it is contiguous **Report on the types of infrastructure implemented** **A reporting establishing the local species** identified that a habitat would need to be provided for **Report on how designs support targeted wildlife species** **Drawings detailing that habitat design**	
38	Nature stewardship	CA	Area of restoration or protection	2					PC	SINSW		The area of restoration must be equivalent to the total GFA of the development, or site area, whichever is greater.	**Offsite Restoration Management Plan** **Evidence of site purchase** **Evidence of formal partnership** **Overview of restoration activities** **Evidence of funding provisions**	
		CA	Location of restoration or protection activities						PC	SINSW		Land for restoration must be in Australia and restored to equivalent ecological value of the site before any development occurred. The location of the land designated for the offsite restoration must not be in the development boundary. A qualified Ecologist must confirm that the ecological value is equivalent.		
		CA	Activities to protect or restore						PC	SINSW		- The project owner protecting or restoring an area offsite themselves; or - The project owner supports an organisation that restores an area on their behalf.		
		CA	Legislated requirements						PC	SINSW		Where the project is required to purchase biodiversity offsets, invest in land restoration, restore land, or similar, as part of an EPBC action or development approval, or other legislated requirements, these actions cannot be used to demonstrate compliance with this credit.		

Nature

Green Star Strategy

	#	Credit Name	Type	Criterion	Points Available	Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk / Cost	Stretch	Timing / Phases	Responsibility: Lead Party	Responsibility: Contributor	Credit Requirement	Deliverable Description	NOTES
Leadership	39	Waterway protection	CA	Runoff volume (40% reduction)	2					Design	Civil		The development must demonstrate an annual average flow reduction (ML/yr) of 40% compared to pre-development levels.	**Calculation/Modelling Report** by a suitably qualified professional. The report should describe: **Civil/Hydraulics drawings** showing the stormwater collection, storage and treatment facilities and detailing their functional elements, **Hydraulics drawings** showing all the capture, storage, piping and discharge route **Site plans** showing the total areas of uncovered areas where vehicles are likely to transit and/or park (e.g. roads, loading docks, refuelling bays, and associations, etc)	OSD tank in design, Civil have confirmed the flow reduction can not be achieved
			CA	Water pollution						Design	Civil		Runoff discharge from site meets the following pollution reduction targets - Total Suspended Solids (TSS) 85% - Gross Pollutants 90% - Total Nitrogen (TN^2) 45% - Total Phosphorus ($TP)^2$ 65% - Environmental Management - minimise the risk of chemical pollutants and other toxicants entering the stormwater system	**Independently verified performance certification** for each manufactured stormwater treatment device, proving its ability to achieve the pollution reduction targets	Targets have been met
			EP	Runoff volume (80% reduction)	2					Design	Civil		The development must demonstrate an annual average flow reduction (ML/yr) of 80% compared to pre-development levels.	**If targeting, evidence same as above.**	
			EP	Water pollution						Design	Civil		Runoff discharge from site meets the following pollution reduction targets - Total Suspended Solids (TSS) 90% - Gross Pollutants 95% - Total Nitrogen (TN^2) 60% - Total Phosphorus ($TP)^2$ 70%	**If targeting, evidence same as above.**	
		SUB-TOTAL			**14**	**2**	**2**	**0**	**0**						
		LEADERSHIP													
	40	Market transformation/ Leading technology or process **(Max. 5 Points, each claim can only target 1 Point)**	INN 1		1									**Description** of the claim; description of how and why the claim is considered leading practice; overview of how the claim is aligned with the GBCA's scoring metrics **Documentation** can be used to demonstrate compliance (TBC)	
			INN 2		1									As above	
			INN 3		1									As above	
			INN 4		1									As above	
			INN 5		1									As above	
			INN 6		1									As above	
			INN 7											As above	
	41	Leadership Challenges **(Unlimited points, however the total leadership/innovation points can be awarded is 10 Points)**	INN 8	Circular Economy CA	2								-The project team identifies and implements circular economy principles and initiatives and; -The project team demonstrates an increased circularity of 10% (weighted by cost)	Project costings/QS report Chain of Custody certificates Letters from Suppliers LCA Report	Leadership Challenge guidelines are yet to be released by GBCA, AECOM will review leadership/innovation points once GBCA publish the guidelines.
				Circular Economy EP	1								In conjunction with the Credit Achievement the project team demonstrates an increased circularity of 20%(weighted by cost)	As above	
			INN 9	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 10	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 11	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 12	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 13	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 14	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 15	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 16	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 17	New GBCA leadership challenge (TBC)	1									TBC	TBC
			INN 18	New GBCA leadership challenge (TBC)	1									TBC	TBC
		SUB-TOTAL			**10**	**0**	**0**	**0**	**0**						

	Points Available	CURRENT STRATEGY COMBINATION: Low Risk / Cost	TBC Med Risk / Cost	TBC High Risk /	Stretch
NON-INNOVATION	97.0	21.0	25.0	6.0	10
INNOVATION	10	0	0	0	0
TOTAL TARGET POINTS	107.0	21.0	25.0	6.0	10
RAW CUMULATIVE SUM		21.0	46.0	52.0	
RISK ADJUSTED CUMULATIVE (MED RISK =75%, HIGH RISK =50%)		21.0	39.8	42.8	
NET ZERO OPERATION PATHWAY POINTS	**(RAW)**	10.00	NOT ACHIEVED		
	(RISK ADJUSTED)	8.00	NOT ACHIEVED		
POINTS REQUIRED (5 Star)		35.0			
PATHWAY OUTCOME	**(RAW)**	4 Star	5 Star	5 Star	
	(RISK ADJUSTED)	4 Star	5 Star	5 Star	



Appendix B

EFSG Schedule

PROJECT:	Glenwood High School	It is the consultant's responsibility to check the level of compliance in the EFSG of each DG. If there is a conflict between the ESD Schedule and the EFSG, the EFSG shall take precedence.				To be complete for all projects			
Theme	Indicator	Sustainability initiatives / requirements from the EFSG This is an extract only from the relevant EFSG. For full requirements refer to https://eue.det.nsw.edu.au/welcome	EFSG	Crossover with Green Star	Standard evidence to demonstrate compliance	Has this been implemented in the project? Y or N	Contractor's ESD consultant comments	Actual evidence proposed This evidence needs to show that the requirement from column C has been met	Responsibility: (identify party responsible to provide evidence)
Energy & carbon	EC1: Energy efficiency		DG02.03	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 model accurately represents the building.	Y	This project is targeting a 20% improvement on NCC requirements as per Green Star Buildings guidelines	Energy modelling report	ESD Consultant
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	DAB c15 GHG Emissions Reduction	1) Section J report 2) Energy impact statement	Y	Preliminary modelling has been used to identify energy-saving strategies	ESD report,	ESD Consultant
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	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)	Y	Project is targeting a minimum of 40% of area with good daylight access	ESD report	ESD Consultant
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	DAB c15 GHG Emissions Reduction	1. As built drawings	Y	Shading devices on N,E, and W façade	As built drawings	Architect
Energy & carbon	EC1: Energy efficiency	**Lighting energy conservation** Lighting system must have timed or sensor feedback functionality for energy conservation	DG2.3.2	DAB c15 GHG Emissions Reduction	1. As built mechanical drawings / statement from head contractor	Y	Sensors to be included in Electrical Design	As built Electrical drawings	Electrical
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	DAB c15 GHG Emissions Reduction	1. As built electrical drawings	Y	LED lighting to be designed on WOL in Electrical Design	As built Electrical drawings	Electrical
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	DAB c15 GHG Emissions Reduction	1) Lighting drawings 2) Lighting specifications / schedules 3) Lighting modelling report showing compliant power densities	Y	Incorporated in Electrical Design	Lighting drawings and specifications	Electrical
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	DAB c15 GHG Emissions Reduction DAB c4 Building Information	1) Commissioning report 2) Confirmation from AMU that all relevant manuals have been handed over	Y	Incorporated in Electrical Design	Specification	Electrical
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	DAB c15 GHG Emissions Reduction	1) Lighting drawings 2) Lighting modelling report showing compliant power densities	Y	Incorporated in Electrical Design	1) Lighting drawings 2) Lighting modelling report showing compliant power densities	Electrical
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 than in small rooms).	DG63.07 DG65.03.01	DAB c15 GHG Emissions Reduction	1) Electrical & lighting drawings showing switching groups and automatic controls	Y	Incorporated in Electrical Design	1) Electrical & lighting drawings showing switching groups and automatic controls	Electrical
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	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.	Y	Incorporated in Mechanical Design	1. As built mechanical drawings / statement from head contractor; 2. Whole of life cost analysis demonstrating systems were selected based on WOL performance.	Mechanical
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	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.	Y	To be included in design by Architect		Architect
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	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	Y	Natural ventilation is to be provided to classrooms and passive design elements have been used to minimise heat gain/loss	Section J report with thermal comfort results	Architect, ESD Consultant, Mechanical
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	DG55 DG06.02 DG27.12	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	Y	Passive shading and insulation provided to achieve. This project is to achieve high levels of comfort in accordance with the NCC2019	Section J report with thermal comfort results	Architect. ESD Consultant
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	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	Y	Ventilation maintained to provide high levels of outside air		Mechanical

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 desianed weather hoods. eaves overhang or other method of protection.	DG05.01	DAB c15 GHG Emissions Reduction	As built drawings demonstrating windows have been installed as required.	Y	Natural ventilation provided with operable windows		Mechanical
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.	DGS7.18	DAB c15 GHG Emissions Reduction	As built mechanical drawings and specifications Extracts from commissioning report	Y	Incorporated into Mechanical design		Mechanical
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	DAB c15 GHG Emissions Reduction	As built mechanical drawings demonstrating ventilation has been installed as required.	Y	Incorporated into Mechanical design		Mechanical
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	DAB c15 GHG Emissions Reduction	Mechanical / electrical drawings showing controls	Y	Incorporated into Mechanical design		Mechanical
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.	DGS7.14	DAB c15 GHG Emissions Reduction	As built mechanical drawings showing location of roof ventilators if installed	Y	Incorporated into Mechanical design		Mechanical
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 DGS7.16	DAB c15 GHG Emissions Reduction	As built mechanical drawings demonstrating ventilation has been installed as required.	Y	Included in Mechanical design		Mechanical
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	DAB c15 GHG Emissions Reduction	As built mechanical drawings demonstrating ventilation has been installed as required.	Y	Included in Mechanical design		Mechanical
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	DGS5	DAB c15 GHG Emissions Reduction	As built drawings demonstrating ceiling/wall fans have been installed as required.	Y	Included in Mechanical design		Mechanical
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 traffic light 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	DGS5	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	Y	Included in Mechanical design		Mechanical
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 · Advise the user of the most suitable replacements for consumables	DG16.10 DG64.10 DG65.02	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	Y			
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 DGS5	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction	1) As installed drawings of PV system 2) Energy modelling report showing renewable energy generation	Y	Included in Electrical design		
Energy & carbon	EC2: Scope 1 & 2 emissions	**Battery Energy Storage System** A battery energy storage system shall only be designed in consultation with SINSW Sustainability sustainability.enquiries@det.nsw.edu.au	DG66.8.3	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction	1) As installed drawings of battery storage system	N	No battery storage system has been designed or approved		
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	DGS6	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	Y	VRV system for heating		Mechanical
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.	DGS3.09	DAB c15 GHG Emissions Reduction	1. WOL cost assessment for hot water systems 2. Hydraulic drawings/schematics showing installed DHW systems	Y			Hydraulic
Energy & carbon	EC3: Scope 3 emissions	Transport plan	N/A	DAB c17 Sustainable Transport		Y	Transport plan in development		Transport
Energy & carbon	EC3: Scope 3 emissions	**Bicycle storage** Provide 1 space for every 20 students to AS2890.3 standard	SGS52 4.36	DAB c17 Sustainable Transport		Y	Bike parking facilities incorporated		Architect

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	DGS3	DAB c18 Potable Water	1. Schedule of fixtures and fittings showing type of urinals and taps installed are as required	Y	Incorporated into Hydraulic design		Hydraulic
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.	DGS3.02 DG2.4.1	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.	Y	Incorporated into design		Architect
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	DGS1.01	DAB c18 Potable Water	1) Hydraulic report showing sustainability initiatives implemented to reduce potable water consumption 2) As built drawings showing trade waste arrestors	Y	Incorporated into Hydraulic design. No trade waste in design		Hydraulic
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	DGS3.04		1) As built hydraulic drawings	Y	Incorporated into Hydraulic design		Hydraulic
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.	DGS3.14 DG2.4.2 DGS3.01	DAB c18B.2 Rainwater Reuse	1) As built hydraulic drawings showing tank connection to end uses and capacity	Y	Incorporated into Hydraulic design		Hydraulic
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 using an alternative non-potable water source.	DG2.4.2	DAB c18B.5 Fire System Test Water	Fire engineering report	Y		Fire engineering report	Hydraulic
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.	DGS3.03	DAB c18 Potable Water	1. Relevant due diligence report / investigation	Y			Hydraulic
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	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)	Y	Incorporated into Civil design		Civil
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 DGS2.	DGS2	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	N	No trade waste in design		Hydraulic
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	DAB c19A - Life cycle assessment	Life cycle assessment report	Y	To be completed using the Green Star Buildings Structure, Envelope, and systems calculator		ESD Consultant
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	GSC c20 - Return on Investment	Life cycle costing report for relevant system	Y	Incorporated in design		Services
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	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	Y	To be completed using the Green Star Buildings Structure, Envelope, and systems calculator. Ultra low VOC paints and sealants		Architect
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	DAB c20.2 Responsible Building Materials - Timber	1. Evidence of chain of custody 2. Bill of quantities	Y	To be completed using the Green Star Buildings Structure, Envelope, and systems calculator.		Architect
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			Y	Incorporated in design		Architect
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	DAB c19B.1	Structural specifications and drawings Structural Engineer's report showing %cement replacement	N	To align with Green Star Buildings minimum expectations a 40% reduction has been targeted. Structural has included in design		Structural
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	DAB c8 Operational Waste	Operational waste management plan Operational waste reports showing diversion rates	Y	OWMP in development		Waste Consultant
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	Not covered in Green Star	As built drawings or statement by relevant professional	Y			Architect
Waste & materials	WM3 – Responsible management of waste	**Construction waste** Consider opportunities for re-use and recycling of materials in the construction phase	DG02.07	DAB c22 Construction and Demolition Waste	Construction waste reports showing percentage of waste re-used and recycled (diverted from landfill)	Y	90% of waste to be diverted from landfill		Contactor
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	DAB c8 Operational Waste	As-built drawings showing location of waste storage area	Y	OWMP in development		Waste Consultant
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		Statement / Report by qualified ecologist	Y			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	GSC c14.2 Local Food Production	Site plan demonstrating location and size of community garden	Y			Landscape

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	GSC c24 Integrated Water Cycle	1. Water cycle management study 2. Evidence that recommendations in the study have been followed / implemented	Y	Incorporated into Civil design		Civil
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	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.	Y			
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	Not covered in Green Star	1) Landscape design report 2) Landscape drawings	Y			Landscape
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	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	TBC			Architect
Place	P2 – Community & heritage connections	Reconciliation action plan	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.	Y	DoE's Reconciliation Action Plan incorporated into design		Architect
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	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)	Y	40% of area is targeted for daylight		ESD Consultant
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	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	Y	Glare controlled by blinds		Architect, ESD Consultant
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	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	Y	Included in Electrical design		Electrical
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	DAB c11.1 General Illuminance and Glare Reduction	Lighting modelling report confirming compliance with required standards and parameters	Y	Included in Electrical design		Electrical
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	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	Y	Included in Electrical design		Electrical
Place	P3 – Welcoming learning spaces	**Thermal comfort** 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	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	Y	Included in Mechanical design		Mechanical
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. - Enclosed circulation areas should be acoustically absorptive	DG55.02 DG08.06	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.	Y	Included in design		Acoustic. Mechanical
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' arrangement or otherwise discontinuous.	DG11.05	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	Y	To be included in design		Acoustic, Architect
Place	P3 – Welcoming learning spaces	**Noise emission (to the environment)** 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	Not covered in Green Star		Y	To be included in design		Acoustic, Architect
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	GSP c13 Internal Noise Levels	1. Commitment by SI to conduct acoustic post-occupancy evaluation	Y	To be included in design		Acoustic, Architect
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	DAB c13 Indoor Pollutants	Product specifications, certificates, safety datasheets that demonstrate low-VOC contents Bill of quantities	Y	Ultra low VOC paints and sealants targeted		Architect

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	DAB c13 Indoor Pollutants	Product specifications, certificates, safety datasheets that demonstrate low-formaldehyde contents Bill of quantities	Y	Low formaldehyde materials targets		Architect
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 changes per hour.	DGS7.07	DAB c9.3 Exhaust or Elimination of Pollutants	1. Mechanical drawings and specifications showing compliant printing room ventilation	Y	Incorporated in Mechanical design		Mechanical
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.	DGS7.09	Not covered in Green Star		Y	Incorporated in Mechanical design		Mechanical
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	Not covered in Green Star	Statement by head contractor that no pesticides or termites have been used.	Y			Contractor
Place	P3 – Welcoming learning spaces	**Green cleaning**	N/A	GSP c6 Green Cleaning	1) WEB Clean School User Guide 2) Green Cleaning specifications	Y	Targeted point		ESD Consultant
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	Not covered in Green Star	As-built drawings showing fly screening has been provided as required	TBC			Architect
Place	P3 – Welcoming learning spaces	**Indoor CO2 levels** 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.	DGS5.02	DAB c9 Indoor Air Quality	Mechanical drawings and specifications Extracts from commissioning report	Y	Incorporated in Mechanical design		Mechanical
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	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.	TBC			Ecologist, Landscape
Place	P3 – Welcoming learning spaces	**Accessibility** -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	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	TBC			Architect
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	Not covered in Green Star	As built drawings showing circulation areas are protected as required	Y	Incorporated into design		Architect
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	Not covered in Green Star	Plan view drawings showing provision of open space	TBC			Architect
Place	P3 – Welcoming learning spaces	**Staff room**	N/A	GSI c Amenity Space	1) Extracts from the EFSG requirements for staff rooms 2) Evidence of staff room delivered accordingly	Y			Architect
Place	P3 – Welcoming learning spaces	**Healthy canteen policy**	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.	N	Not applicable to this design		
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: Glazing: 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 a minimum. Hot water: 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) Drinking water tanks: 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 DGS3.11 DGS3.16 DGS3.17	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	Y			
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.	DGS1.09 DGS3.11	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.	Y	Included in Hydraulic design		Hydraulic

Place	P3 – Welcoming learning spaces	**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	DG14.10 DG65.08 DG65.10	GSC c15 Safe Places	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	TBC			ICT
Place	P3 – Welcoming learning spaces	**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 prepared	DG48.01	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	Y			
Place	P3 – Welcoming learning spaces	**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	DG64.12.02	GSC c22.2 Digital Infrastructure	1) Contracts describing the network infrastructure specification and operational requirements	Y			ICT
Place	P3 – Welcoming learning spaces	**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	DG02.09	All credits	1) Green Star scorecard demonstrated the final design is benchmarked to the required rating (by a Green Star Accredited Professional)	Y	5 Star Green Star Buildings rating		ESD Consultant
Resilience	R1 – Preparation for shocks	**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).	DG03.02	DAB c3 Adaptation and Resilience	1) Detailed reports or surveys developed 2) Environmental risk report 3) Evidence demonstrating recommendations have been implemented and risks addressed through design responses.	Y	All identified during climate resilience workshop		ESD Consultant
Resilience	R1 – Preparation for shocks	**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).	DG13.01	DAB c3 Adaptation and Resilience	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	Y			Fire
Resilience	R2 – Preparation for stresses	**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.	DG02.08	DAB c3 Adaptation and Resilience	1) Climate risk assessment, and 2) Climate adaptation plan 3) Emergency management plan	Y	All identified during climate resilience workshop		ESD Consultant
Other		Add here							
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Appendix C

Climate and Operational Risk Assessment Summary

Risk No.	Risk	2030 - Climate Risk Assessment				2090 - Climate Risk Assessment				Mitigation Measure	Responsibility	2030				2090			
		Likelihood	Consequence	Likelihood / Consequence	Risk Rating	Likelihood	Consequence	Likelihood / Consequence	Risk Rating			Likelihood	Consequer	Likelihood / Consequence	Risk Ratin	Likelihood	Consequer	Likelihood / Consequence	Risk Ratin
Climate Risks																			
Extreme heat																			
EH1	Persistent higher temperatures overload HVAC capacity, Increased energy consumption, maintenance cost	Likely	Moderate	Likely / Moderate	Medium	Almost certain	Moderate	Almost certain / Moderate	High	Mechanical equipment designed/selected for higher temperatures	Mechanical	Likely	Minor	Likely / Minor	Medium	Likely	Minor	Likely / Minor	Medium
EH2	Extreme heat ruptures pipes or ductwork	Unlikely	Minor	Unlikely / Minor	Low	Possible	Minor	Possible / Minor	Low	All inground pipework will be protected from heat and pipework located within the building robust pipework selection.	Mechanical	Unlikely	Insignificant	Unlikely / Insignificant	Low	Unlikely	Minor	Unlikely / Minor	Low
EH3	Heat waves lead to impacts on human health and discomfort to students outdoors	Likely	Minor	Likely / Minor	Medium	Likely	Minor	Likely / Minor	Medium	External shading and vegetation are incorporated into architectural design. This will provide refuge for students during heat waves	Architectural, Landscape Architecture	Likely	Minor	Likely / Minor	Medium	Likely	Minor	Likely / Minor	Medium
EH4	Heat wave events compromise comfort conditions in classrooms (risk of heat stress/illness to students)	Possible	Moderate	Possible / Moderate	Medium	Possible	Moderate	Possible / Moderate	Medium	External shading and HVAC is incorporated into the building design and will provide internal and external refuge for students during heat waves	Mechanical, Architectural	Possible	Minor	Possible / Minor	Low	Possible	Minor	Possible / Minor	Low
Extreme Rainfall																			
ER1	Flash flooding may cut off local access to school grounds	Likely	Minor	Likely / Minor	Medium	Likely	Minor	Likely / Minor	Medium	In the event that the piped in-ground stormwater system fails due to blockage or other obstruction, stormwater flows will be conveyed as overland flow and directed away from buildings. Overland flow paths will be sized to accommodate the 1% AEP storm flows.	Civil	Possible	Minor	Possible / Minor	Low	Possible	Minor	Possible / Minor	Low
ER2	Inundation damages building and school services	Unlikely	Major	Unlikely / Major	Medium	Unlikely	Major	Unlikely / Major	Medium	The building shall be weatherproof to ensure no rainwater enters the building. The hydraulic roof drainage system will be designed for a storm event, as per AS3500.3 2018. Overland flow is designed to the 1% AEP	Civil, Architectural, Hydraulic	Unlikely	Moderate	Unlikely / Moderate	Medium	Unlikely	Moderate	Unlikely / Modera	Medium
ER3	Loss of access to public transport to the school during adverse weather events	Unlikely	Moderate	Unlikely / Moderate	Medium	Possible	Moderate	Possible / Moderate	Medium	Transport plan has been developed to increase active transport. Online/remote learning in place in the case of school closure or if school is inaccessible (i.e. road closure)	BCC	Unlikely	Insignificant	Unlikely / Insignificant	Low	Unlikely	Minor	Unlikely / Minor	Low
ER4	School closure due to inundation, putting pressure on parents/careers	Unlikely	Moderate	Unlikely / Moderate	Medium	Possible	Moderate	Possible / Moderate	Medium	Site is designed to 1% AEP storm flows. Building will be used as refuge during school hours	Civil, SINSW	Unlikely	Minor	Unlikely / Minor	Low	Unlikely	Minor	Unlikely / Minor	Low
ER5	Extreme rainfall events causing safety concerns for students, staff and other occupants	Likely	Minor	Likely / Minor	Medium	Almost certain	Minor	Almost certain / Minor	Medium	Site is designed to 1% AEP storm flows. Building will be used as refuge during school hours	Civil	Possible	Insignificant	Possible / Insignificant	Low	Likely	Insignificant	Likely / Insignific	Low
Storm Events, Wind and Hail																			
SE1	Large hail and strong wind damages structure or building fabric (roof structure, windows, landscape, guttering)	Likely	Moderate	Likely / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium	The building is designed to standards such as AS1170 for such weather events.	Architectural, Structural	Likely	Moderate	Likely / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium
SE2	Hail and wind damaging plant, causing disruption to operation (e.g. PV panels, plant on roof, etc)	Likely	Moderate	Likely / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium	External plant is designed to be robust and resistant to the outdoors, including weather events. Where required, louvres enclosure will be provided.	Architectural, Structural, Mechanical, Hydraulic	Likely	Minor	Likely / Minor	Medium	Likely	Minor	Likely / Minor	Medium
SE3	Extreme rainfall damages roof structure	Likely	Moderate	Likely / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium	The building design has been designed to ensure the strength of structure can withstand the extra weight from heavy downpours.	Structural, Architectural	Likely	Insignificant	Likely / Insignificant	Low	Likely	Minor	Likely / Minor	Medium
SE4	Rain/moisture penetration following storm events causing health/safety issues	Likely	Moderate	Likely / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium	The building shall be weatherproof to ensure no rainwater enters the building. The hydraulic roof drainage system will be designed for storm events, as per AS3500.3 2018.	Hydraulic, Architectural	Likely	Insignificant	Likely / Insignificant	Low	Likely	Minor	Likely / Minor	Medium
SE5	Extreme events causing safety concerns for students, staff and other occupants	Likely	Minor	Likely / Minor	Medium	Almost certain	Minor	Almost certain / Minor	Medium	Building will be used as refuge during school hours	SINSW	Likely	Insignificant	Likely / Insignificant	Low	Likely	Insignificant	Likely / Insignific	Low
Mean Rainfall Change																			
MR1	Increase in pests such as flies and mosquitoes due to extreme wet and extreme dry conditions leading to disease	Possible	Moderate	Possible / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium	RWH tank will be sealed and incorporate vermin resistant filters. The gutters and downpipes will be designed to AS3500.3 - 2018 to ensure no ponding of water exists.	Civil, Hydraulic	Possible	Minor	Possible / Minor	Low	Possible	Minor	Possible / Minor	Low
MR2	Increased water demand during periods of drought	Possible	Minor	Possible / Minor	Low	Possible	Minor	Possible / Minor	Low	Rain water Harvesting tank volume will be determined based upon BOM statistical information to overcome this.	Hydraulic	Possible	Insignificant	Possible / Insignificant	Low	Possible	Insignificant	Possible / Insigni	Low
MR3	Change in rain availability may result in inadequate rainwater tank capacity which will increase demand on mains water	Possible	Insignificant	Possible / Insignificant	Low	Possible	Insignificant	Possible / Insignificant	Low	Rain water harvesting tank volume will be determined based upon BOM statistical information to overcome this.	Hydraulic	Unlikely	Insignificant	Unlikely / Insignificant	Low	Unlikely	Insignificant	Unlikely / Insignif	Low
MR4	Change in rainfall patterns may decrease the available potable water (water restrictions)	Possible	Insignificant	Possible / Insignificant	Low	Possible	Insignificant	Possible / Insignificant	Low	Water saving devices incorporated into design to reduce water consumption. Rainwater reuse and non-potable recycled water mains (to amenities) have been implemented to reduce potable water demand.	Hydraulic	Unlikely	Insignificant	Unlikely / Insignificant	Low	Unlikely	Insignificant	Unlikely / Insignif	Low
Bushfires																			
BF1	Nearby bushfires may trigger false fire alarms	Likely	Minor	Likely / Minor	Medium	Likely	Minor	Likely / Minor	Medium	Filters on HVAC supply air intake to reduce smoke particulates entering the building	Mechanical	Possible	Minor	Possible / Minor	Low	Possible	Minor	Possible / Minor	Low
BF2	Smoke from bushfires reducing air quality, impacting on health of occupants	Likely	Major	Likely / Major	High	Likely	Major	Likely / Major	High	Filters on HVAC supply air intake to reduce smoke particulates entering the building	Mechanical	Likely	Moderate	Likely / Moderate	Medium	Likely	Moderate	Likely / Moderate	Medium
BF3	Heatwave event/bushfires promote embar attack to flammable facades	Possible	Major	Possible / Major	High	Possible	Major	Possible / Major	High	As required by the code, the façade will not be flammable. Any fire outbreaks will be controlled with the fire hydrant system via the fire brigade.	Architectural, Fire	Possible	Moderate	Possible / Moderate	Medium	Possible	Moderate	Possible / Moder	Medium
BF4	Reduced air quality from bushfire smoke impacting ventilation and air conditioning systems	Possible	Major	Possible / Major	High	Possible	Major	Possible / Major	High	Filters on HVAC supply air intake to reduce smoke particulates entering the building	Mechanical	Possible	Moderate	Possible / Moderate	Medium	Possible	Moderate	Possible / Moder	Medium
Relative Humidity																			
RH1	High humidity and dry bulb temperatures reduces efficiency of HVAC	Unlikely	Minor	Unlikely / Minor	Low	Possible	Minor	Possible / Minor	Low	Mechanical equipment designed/selected to withstand high temperature and humidity. Maintenance is to be undertaken to ensure HVAC is operating at optimal efficiency	Mechanical	Unlikely	Minor	Unlikely / Minor	Low	Possible	Minor	Possible / Minor	Low
RH2	Changes to environment suitable for water borne diseases and pest species distribution including mould distribution	Unlikely	Minor	Unlikely / Minor	Low	Possible	Minor	Possible / Minor	Low	Mechanical equipment designed/selected to withstand high temperature and humidity. No water source heat rejection used on site.	Mechanical	Unlikely	Minor	Unlikely / Minor	Low	Possible	Minor	Possible / Minor	Low

Risk No.	Risk	Likelihood / Consequence	Risk Rating	Mitigation	Responsibility	Likelihood / Consequence	Risk Rating
Operational Risks							
Health Pandemic							
HP1	Pandemic lockdowns create supply chain shortages of essentials for occupants (such as basic food and toiletries)	Possible / Minor	Low	SINSW TO COMMENT School policy and procedures to mitigate impacts to school due to health pandemics	SINSW	Possible / Minor	Low
HP2	Health risk of virus being caught and spread within school to students, staff and other occupants	Possible / Moderate	Medium	SINSW TO COMMENT School policy and procedures to mitigate impacts to school due to health pandemics	SINSW	Possible / Moderate	Medium
HP3	Lockdowns mandated by the government resulting in quick transition to online learning, impacting student's ability to learn	Possible / Minor	Low	SINSW TO COMMENT School policy and procedures to mitigate impacts to school due to health pandemics	SINSW	Possible / Minor	Low
HP4	More stringent air quality requirements are mandated, requiring maintenance of HVAC and additional operating costs	Unlikely / Minor	Low	Mechanical plant selected with high air quality requirements.	Mechanical, SINSW	Unlikely / Minor	Low
Water Security							
WS1	Water restrictions imposed, with reduced potable water available for occupants	Likely / Minor	Medium	Water saving devices incorporated into design to reduce water consumption. Rainwater reuse and non-potable recycled water mains have been incorporated into the design to reduce potable water demand.	Architecture, Civil	Likely / Minor	Medium
WS2	Reduced rainwater collection for irrigation watering leading to vegetation loss	Likely / Minor	Medium	Vegetation selected with minimal watering requirements. Water tank sized appropriately to store irrigation needs	Civil, Hydraulic, Landscaping	Possible / Insignificant	Low
Critical Infrastructure Failure							
CI1	Loss of power and reduced functionality of associated systems (HVAC, BMS) leading to reduced quality of operations which is uncomfortable for users.	Possible / Minor	Low	Redundancies incorporated into design (such as natural ventilation, sunlight) for building to operate in island mode with adequate user comfort	All Disciplines	Possible / Insignificant	Low
CI2	Water outage impacting fire hydrant protection	Rare / Moderate	Low	Fire hydrant pumps are diesel powered to avoid reliance on the grid. Water tanks will be maintained at required level.	Hydraulic, Fire	Rare / Minor	Low
Direct Attack						/	
DA1	Physical intrusion harms students and teachers	Unlikely / Catastrophic	High	Access control and CCTV monitoring at perimeter entry points	ICT	Unlikely / Major	Medium
DA2	Physical intrusion damages assets	Possible / Major	High	Access control and CCTV monitoring at perimeter entry points. Graffiti resistant finishes will be selected where possible	ICT	Unlikely / Major	Medium
DA3	School lockdown due to a student being harmed/under duress	Unlikely / Minor	Low	SINSW TO COMMENT School policy and procedures to mitigate impacts to school due to intrusion	SINSW	Unlikely / Minor	Low
Geological Hazards							
GH1	Geological hazard (flood, fire, seismic event) occurs causing harm to building or occupants	Possible / Moderate	Medium	Refer to Table 7 for specific measures.	All Disciplines	Possible / Moderate	Medium
Aging Infrastructure							
AI1	Increased failure and maintenance required, increasing operational and maintenance costs	Likely / Moderate	Medium	Less reliance on BCC infrastructure with lower potable water and energy demand	All Disciplines	Likely / Moderate	Medium
AI2	Failure, maintenance and renovations of infrastructure causes disruption to learning	Likely / Minor	Medium	Online/remote learning in place to reduce reliance on aging infrastructure.	SINSW	Likely / Minor	Medium
Operational Costs/Availability							

OC1	Increased electricity costs creating a burden on operational expenditure budgets	Rare / Minor	Low	Energy efficient systems have been selected in design. The PV cells on the new building will further decrease grid reliance	Electrical, Mechanical, Architectural	Rare / Insignificant	Low
OC2	Phase down of existing HFC/CFCs due to Global Warming Potential of refrigerants leading to not being able to recharge current systems. Increased capital cost to replace AC systems	Unlikely / Major	Medium	AC system designed to be replaced with alternative refrigerant systems.	Mechanical	Unlikely / Moderate	Medium
Rising Cyber Dependency							
CD1	Failure of building management system leading to disruptions in building services, causing discomfort for occupants	Unlikely / Minor	Low	Redundancies incorporated into design for building to operate in island mode with adequate user comfort	Architecture, ICT, Mechanical	Unlikely / Minor	Low
CD2	Cyber attack results in theft of student/family information and compromises safety of students	Possible / Major	High	SINSW/DET Network infrastructure - Store sensitive data locally rather than cloud-based; Local VMS servers limits external network traffic; Third-party remote learning solutions (zoom, recording for playback, emailed worksheets, etc)	ICT, SINSW	Unlikely / Major	Medium
CD3	Cyber attack prevents ability for school to function in online remote learning	Possible / Major	High	SINSW/DET Network infrastructure - Store sensitive data locally rather than cloud-based; Local VMS servers limits external network traffic; Third-party remote learning solutions (zoom, recording for playback, emailed worksheets, etc)	ICT, SINSW	Unlikely / Major	Medium
Transport Accessibility and Availability							
TA1	Interruptions to waste removal from school, compromising the health and safety of students	Unlikely / Minor	Low	SINSW TO COMMENT	SINSW	Unlikely / Minor	Low
TA2	Cost of transport puts stress on low-income families, reducing students' ability to get to school	Possible / Minor	Low	SINSW TO COMMENT	SINSW	Possible / Minor	Low