Sustainable Development Plan

SINSW Cluster C – Rouse Hill High School

ESD SERVICES

JHA

CONSULTING ENGINEERS

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DOCUMENT CONTROL SHEET

Project Number	220210
Project Name	SINSW Cluster C – Rouse Hill High School
Report Phase	Phase 3
Description	Sustainable Development Plan
Key Contact	George Economy

Prepared By

Company	JHA
Address	Level 20, 2 Market Street, Sydney NSW 2000
Phone	61-2-9437 1000
Email	Gary.Tang@jhaengineers.com.au
Website	www.jhaservices.com
Author	Gary Tang, Laura Golembowski
Checked	Gary Tang
Authorised	Lawrence Yu

Revision History

Issued To	Revision and Date								
SINSW	**REV**	Draft	**REV**	C					
	DATE	19/09/2022	**DATE**	20/01/2025					
	REV	A	**REV**	D					
	DATE	07/10/2022	**DATE**	23/01/2025					
	REV	B	**REV**	E					
	DATE	29/11/2022	**DATE**	12/02/2025					

CONTENTS

1 EXECUTIVE SUMMARY

This Sustainable Development Plan has been prepared by JHA for the proposed upgrades to Rouse Hill High School.

This report states the proposed ESD initiatives to achieve compliance with Educational Facilities Standard Guidelines (EFSG) DG02 requirements and 5 Star Green Star Design & As-Built v1.3 certification. This report should be read in conjunction with the Architectural drawings, EFSG DG02, Green Star Design & As-Built v1.3 Submission Guidelines and other consultant reports submitted as part of the application.

The ESD objectives is to encourage a balanced approach to designing new facilities for the public school project; to be resource efficient, cost-effective in construction and operation; and to deliver enhanced sustainability benefits with respect to impacts on the environment and on the health and well-being of students, staff and visitors whilst providing the best possible facilities for a constructive student learning experience.

Some of the key ESD commitments for the proposed development are listed below:

- Good access to natural daylight
- Well-designed openings to promote natural ventilation
- Appropriate construction and glazing selection
- Energy efficient air-conditioning systems
- LED luminaires
- Efficient water fixtures
- Waste management plan
- Water-wise landscaping

2 INTRODUCTION

This Sustainable Development Plan has been prepared to accompany a Review of Environmental Factors (REF) for the Department of Education (DoE) for upgrades to Rouse Hill High School (the activity) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP TI).

This document has been prepared in accordance with the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure.

This report examines and takes into account the relevant environmental factors in the Guidelines and *Environmental Planning and Assessment Regulations 2021* under Section 170, Section 171 and Section 171A of the EP&A Regulation as outlined in Table 1.

Table 1 – Summary of Relevant Section of the Part 5 Guidelines and EP&A Regulation

Regulation / Guideline Section	Requirement	Response	Report Section
Guidelines for Division 5.1 assessments	Considering environmental factors: h) Any long-term effects on the environment Climate change j) Any risk to the safety of the environment Public health, bushfire, sea level rise, flood, storm surge, wind speeds, extreme heat, urban heat and climate change adaptation l) Any pollution of the environment Air (greenhouse gases), water (runoff patterns), noise and vibration, light pollution m) Any environmental problems associated with the disposal of waste Transportation, disposal and contamination	The project incorporates the Educational Facilities Standards and Guidelines (EFSG) and the Green Star Design & As-Built v1.3 framework (5 Star rating) to keep the impacts on the environments low. The project also delivers a Climate Change Risk & Adaptation Assessment (see Appendix D) to specifically assess the climate change scenarios and impacts, as well as identify the potential risks for the project and people. This information helps to address the risks and prepare adaptation measures.	See Section 3-5, and Appendix A-D

2.1 PROPOSED ACTIVITY DESCRIPTION

The proposed activity for the alterations and additions to Rouse Hill High School including:

- Demolition of existing footpaths, stairs, and the relocation of an existing seating shelters towards the west of Block F;
- Tree removal;
- Construction of a two (2) storey classroom building (known as Building L), comprising eleven (11) general learning spaces (GLS) and 2 Science Labs;
- Construction of new footpaths and a new covered bicycle parking space;
- New emergency vehicle access; and
- Landscaping, including the planting of trees.

This report covers the requirement of EFSG (applicable to the whole project) and the design requirements to achieve a 5 Star Green Star Design & As-Built certification of the proposed new Building L.

2.2 ACTIVITY SITE

The project site is located on Withers Road in Rouse Hill and is legally described as Lot 105 in Deposited Plan (DP) 1108407. Rouse Hill High School is located on the western side of Withers Road.

Figure 1 provides an aerial photograph of the site.

Figure 1: Aerial Photograph

3 EFSG SUSTAINABILITY TARGETS

3.1 OVERVIEW

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

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

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

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

3.2 SCOPE

All school projects in Planning phases must develop a Sustainable Development Plan including sustainability targets, initiatives and an ESD schedule detailing the relevant Green Star/EFSG pathway adopted for the project. The NSW Government Resource Efficiency Policy's (GREP) is a mandatory NSW Government policy to reduce the NSW Government's operating costs and lead by example in increasing resource efficiency through ESD principles. GREP requires all new projects above 1,000m^2 and project costs over $10 million to be designed to the following standard:

- 5 Stars Green Star for projects located in metropolitan Sydney, Wollongong, and Newcastle,
- 4 Stars Green Star for projects located in other areas of NSW

Proposed development is targeting 5 Star Green Star Design & As-Built v1.3 certification, which will cover the compliance with this requirement.

3.3 NSW GOVERNMENT RESOURCE EFFICIENCY POLICY

The purpose of GREP is to reduce NSW government agency operating costs by implementing resource efficiency measures, and its implementation is mandatory for all NSW Government agencies, including the Department of Education. The policy includes measures, targets and minimum standards to drive efficiency in energy and water use and waste and also improving air quality.

3.4 ENERGY CONSERVATION

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

3.5 CLIMATE CHANGE

In accordance with EFSG v1.0 DG02.08 Climate Change Adaptation and EFSG 2.0 0001c Design Checklist – Sustainability: 0.05 Climate Change Adaptation, an initial assessment of natural hazards and project vulnerability has been carried out in the previous phase of the project. The design measures that are to be undertaken by the project team to address the risks identified are provided in Appendix D – Climate Change Risk and Adaptation Assessment.

4 GREEN STAR DESIGN & AS BUILT

The proposed development is targeting a 5 Star Green Star Design & As-Built v1.3 rating for the new buildings.

4.1 OVERVIEW

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

The Green Star framework incorporates ESD principles which are categories into nine categories. Points are awarded across each category for credits that are incorporated into the project. The Design and As-built documentation is then verified through two rounds of independent assessments by the Green Building Council of Australia (GBCA). This section outlines the initial review to the pathway of Rouse Hill School for achieving the principles of a 5 Star certified rating under the Green Star Design and As Built tool version 1.3.

4.2 THE GREEN STAR RATING SCALE

The Green Star rating is determined by comparing the percentage of available points achieved out for the total available points. The rating scale shown below details the percentage thresholds for the star ratings awarded. However, the GBCA only certifies projects that achieve a *Green Star – Design & As Built* rating of 4, 5 or 6 Stars.

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

The credit points available for each category are as follows.

Category	Available Points
Management	14
Indoor Environment Quality	17
Energy	22
Transport	10
Water	12
Materials	14
Land Use & Ecology	6
Emissions	5
Total	100 points + 10 innovation

4.3 SINSW UMBRELLA GREEN STAR CREDIT RECOMMENDATIONS

To support the large volume of new schools that will be certified by the GBCA using the Green Star Tool, SINSW has partnered with the GBCA to streamline the documentation and assessment process for schools.

The SINSW Green Star Credit Recommendations spreadsheet has been developed to consider how each credit in Green Star may be applied to SINSW schools. The spreadsheet also details SINSW's preferred approach for projects to achieve each credit, including any pre-approved alternate approaches agreed to by the GBCA in response to a Technical Question (TQ). It provides references to relevant sections of the EFSG or other policies or guidelines, and examples of standard project documentation that could be used as supporting evidence in claiming a credit.

4.4 DESIGN POINTS FOR THIS PROJECT

In accordance with GREP requirements, compliance with EFSG, and under SINSW Green Star umbrella, the Green Star points that can be targeted for this project are tabled as below.

Category	Total Points Targeted
Management	12
Indoor Environment Quality	10
Energy	7
Transport	10
Water	6
Materials	7
Land Use & Ecology	2
Emissions	4
Innovation	10
Total	**68** (58 points + 10 innovation)
Buffer in Achieving 5 Star	8 Points

5 SUSTAINABLE DESIGN FRAMEWORK

5.1 FRAMEWORK

The sustainable design framework for this development aims to incorporate the best practice design initiatives and ESD principles into the development. The ESD initiatives and targets outlined within this framework have been compiled based on the following:

- National Construction Code 2022 Section J
- Green Star Design & As-Built v1.3
- Principles of the Educational Facilities Standards and Guidelines (EFSG)

5.2 BUILDING ENVELOPE

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

5.2.1 BUILDING ENVELOPE PERFORMANCE

The building fabric will be designed to meet or exceed the NCC 2022 Section J requirements for the building envelope. Thermal breaks will be incorporated into walls, floors, and roofs where appropriate to ensure a continuous thermal barrier on the building envelope, reducing the flow of thermal energy between conductive materials.

The indicative results on total construction R-value requirements demonstrating compliance with NCC 2022 Section J are provided below.

5.2.2 BUILDING FABRIC & GLAZING

The building fabric will be designed to provide a 10% improvement from the NCC 2022 Section J Part J4. The minimum performance requirements obtained under Section J Deemed-to-Satisfy provision, coupled with 10% additional for the development (Class 9b) at the proposed location (Climate Zone 6) as per the NCC 2022 Section J - Energy Efficiency are below.

Building Elements	Indicative NCC 2022 Requirements (with 10% improvement)
Envelope Roof/Ceiling	Total R-Value of 3.6 (Downwards, Light Colour Roof Solar absorptance of the upper surface of a roof must be not more than 0.40)
Envelope Walls	Total R-Value of 1.6
Envelope Floors	Total R-Value of 2.2 (Downwards)

Note: The impact of thermal bridging must be considered within the total R-value calculation under NCC2022.

This will necessitate the use of insulation in the walls, floor, and roof for the building fabrics. Insulation reduces heat flow and consequent heat loss in winter and heat gain in summer. This minimises the heating and cooling load demand on the air conditioning systems. Light-coloured roof material with a low solar absorptance (SA) is recommended to be used to isolate more sunlight and reduce summer heat gain. It also has the effect of reducing elevated localised temperatures (the Heat Island Effect) and potentially can improve the efficiency of solar PV panels as they perform more efficiently in reduced temperatures.

Glazing is a major source of unwanted heat gain in the summer and can cause significant heat loss in the winter due to its low insulation performance. It is thus recommended that windows be high-performance glazing systems. Performance glazing substantially reduces heat transmission. This particularly reduces heat loss in winter; therefore, internal heat gain from equipment, lighting and people are better contained. Also, performance glazing absorbs the infrared portion of

sunlight and reduces the amount of heat transferred into the conditioned space. This will correspond to a reduction of both heating and cooling loads.

The building will be designed to comply with NCC 2022 Section J Energy Efficiency. Based on the Part J4 DTS pathway, the glazing performance requirements are below.

Building Elements	Requirements
External Vertical Glazing	Total U-value = 4.6 & Total SHGC = 0.49 | Single Low-E Neutral or the Like Min VLT > 60%

No skylights are proposed.

5.3 SHADING AND DAYLIGHTING

Solar access can enhance indoor environmental quality through access to daylighting and reduce lighting energy consumption. However, excessive solar access and hence, direct solar radiation heat can increase HVAC energy demand and can also cause thermal discomfort. The passive solar heating principle which aims to prevent solar heat gain in the summer and harvest it in the winter for a free source of heating, and the Passive cooling principle which prevents heat from entering the building during the summer months, are strategies that can conveniently take advantage of the site-specific solar access for optimised indoor environmental quality and reduction of HVAC energy demand through the use of tailored shadings.

The proposed building is to be designed to make the best use of the sun by using external high-performance horizontal eave shading to prevent the high summer sun from entering the building whilst allowing the low winter sun to enter the building for passive heating.

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

5.4 NATURAL VENTILATION

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

The design team proposed to utilise natural ventilation and air circulation through operable windows.

5.5 ENERGY EFFICIENCY

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

5.5.1 HEATING, COOLING AND VENTILATION SYSTEMS

The air-conditioning and ventilation systems shall be designed to comply with and exceed the minimum requirements of NCC 2022 Section J6 requirement.

The occupied spaces will be having high-efficiency air conditioning as required. Air-cooled heat rejection system to be used as this will help minimise the impacts associated with harmful microbes (e.g. Legionella impact).

All bathrooms/toilets, laundries (if any), and general exhaust are to be naturally ventilated where possible, with mechanical ventilation required where necessary. The design will have a sufficient amount of exhaust fans to ensure liveability for the building users.

The control of the air conditioning system shall be designed to minimise energy consumption. Further, high-efficiency equipment for the HVAC system will be selected to assist with the energy conservation of the building.

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

5.5.2 LIGHTING

Lighting is to be designed to comply with NCC 2022 Section J7. Also, the Lighting illumination density is to be according to NCC2022 Section J7D3. Fittings incorporating the latest lamp technologies to be installed to minimise energy use and provide efficient artificial lighting systems. The proposed development shall be illuminated using LED fittings and be controlled via an automatic control system with timer controls, PIR occupancy sensors and microwave occupancy sensors.

Lighting in regularly occupied spaces shall be provided with a daylight sensor (PE Cells) to reduce light output or turn off lights when sufficient daylight is provided within the space. For large spaces, perimeter lighting shall be designated in a separate zone to make maximum use of daylight.

All the external luminaires proposed will be according to AS 4282:1997. This will make sure that the external luminaires do not emit light pollution to the night sky above a given benchmark.

5.5.3 CONTROLS

All HVAC installed shall be controlled by the HVAC group controller. Closed spaces such as storage rooms and cleaners' cupboards are to be provided with a wall switch. For BOH areas (not task-specific areas) PIR sensors are to be provided. Voltage control (dimming) should be provided where appropriate.

5.5.4 ELECTRICITY METERING

Electricity metering and sub-metering shall be specified in accordance with Section J and Green Star requirements to monitor and manage electricity consumption in the building. Sub-metering is to be provided to distinct locations (e.g. PV generation)

5.5.5 PHOTOVOLTAICS

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

5.6 INDOOR AIR QUALITY (IAQ)

The quality of indoor air has a significant impact on our health and environment. Poor indoor air quality results in adverse health effects such as allergies, asthma, etc. The ventilation system shall be designed to minimise the entry of outdoor pollutants as per ASHRAE Standard 62.1:2013 and should comply with AS1668.2:2012.

5.7 WATER CONSERVATION

The following initiatives are proposed to ensure that significant water saving is achieved.

5.7.1 FITTINGS AND FIXTURES

Water consumption shall be reduced by incorporating water-efficient fixtures and fittings in accordance with the Australian Government's Water Efficiency Labelling Scheme (WELS). The fixtures and fittings to meet the minimum WELS Rating. In

addition, flow restrictors or taps with timed flows can be used to minimise water usage. Commercial appliances should perform at similar levels. The final WELS rating is subject to product selection and WHS requirements.

Water Fittings/fixtures	Minimum WELS Rating	Highest Available Rating (AS/NZS 6400-2016)
Showerhead rating	3 (>6.0, but <= 7.5L/min)	4
Toilet rating	4	5
Urinals	5	5
Taps and flow controllers	5	6
Dishwashers (if any)	5	6
Washing machines (if any)	4	6

5.7.2 RAINWATER COLLECTION AND REUSE

The project will consider the capturing of rainwater for reuse in toilet flushing and landscape irrigation. Rainwater tank with a minimum volume of 10L/m^2 of GFA is to be provided to reduce potable water consumption.

5.7.3 WATER-SENSITIVE URBAN DESIGN

The project is to implement best practices of water-sensitive design by decreasing the total suspended solids in stormwater and by not using water for heat rejection. A detailed stormwater management plan including water-sensitive urban design (WSUD) to be completed by a civil/stormwater consultant.

5.8 SUSTAINABLE MATERIALS

5.8.1 LOW VOC/LOW FORMALDEHYDE MATERIALS

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

5.9 VISUAL COMFORT

The building design will ensure at least 40% of the regularly occupied areas receive a high level of daylight and blinds will be provided to reduce glare. Also, the building shall be designed to ensure at least 60% of the regularly occupied spaces have a clear line of sight to high-quality internal or external views.

5.10 TRANSPORT

5.10.1 LOW-EMISSION VEHICLE INFRASTRUCTURE

On-site parking arrangements will remain the same with no additional parking to be provided as part of the school expansion works. Additional bicycle parking is to be provided as a result of the expansion works. The total number of bicycle parking units is analysed as part of the Transport Impact Assessment.

5.11 WASTE

Waste collection and disposal play an important role in the protection of the environment and the health of the population in the modern world. A waste management plan will be prepared to assess and monitor the waste management process during the construction and demolition, as well as a waste-produced during occupation within the development. The

waste management plan shall incorporate how to minimise the amount of waste generated, maximise the reuse, recycling and reprocessing of construction waste materials and minimise the volume of materials disposed to landfill. Refer to the waste consultant report for details.

5.12 CLIMATE CHANGE ADAPTATIONS

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

To mitigate the adverse impacts of climate change on the future of the school, the following responsible parties need to ensure the appropriate adaptation strategies to the identified Climate Risks are considered and implemented within the project design (see Appendix D).

5.13 MITIGATION MEASURES

The following Table 2 captures all measures required to be implemented as a result of this Sustainable Development Plan and Table 1 (see Introduction). Due to the quantity of mitigation measures resulting from the ESD targets, they have been generalised below. For a detailed overview of the measures refer to the Appendix.

Table 2 – Mitigation Measures

Mitigation Number/Name	When is Mitigation Measure to be complied with	Mitigation Measure	Reason for Mitigation Measure
ESD Targets	Prior to commencement of construction works: All disciplines to incorporate mitigation measures in their Construction Documentation.	General ESD targets for the project	To ensure ESD targets are met. To ensure climate change adaptation is addressed. To ensure any climate change risks are managed. To ensure high risks are mitigated to medium risks. To ensure any pollution of environment is managed. To ensure responsible disposal of waste.
	Prior to Commencement of Operation: All disciplines to provide as-built package reflecting what has been built is aligned with CC documentations.		

5.14 EVALUATION OF ENVIRONMENTAL IMPACTS

With regards to Table 1 and Table 2, the environmental impacts caused by the development are adequately mitigated through the recommended measures and are not considered to be a significant impact.

APPENDIX A – EFSG SCHEDULE

PROJECT:	220210 SINSW Cluster C Rouse Hill (Phase 3)
REVISION	5
AUTHOR	Gary Tang

Sustainability Strategy Priority	Sustainability initiatives / requirements Where application, this is an extract only from the relevant EFSG. For full requirements refer to https://efsg.det.nsw.edu.au/	Project stage	Basis for Initiative	Crossover with Green Star	Recommended evidence to demonstrate compliance	Are these achieveable to the project? Y or N or NA	ESD consultant comments	Example evidence This evidence needs to show that the requirement from column C has been met	Responsibility: (identify party responsible to provide evidence)	Consultant Comments
Act on climate change	**Improvement over NCC** All new facilities must be designed and built so that energy consumption is predicted to be at least 10% lower than if build to minimum compliance with National Construction Code requirements. Each building's system and façade must comply with the corresponding Section J requirements in the National Construction Code. That is, the building cannot show that their façade, or any system, performs worse than the reference building. The energy consumption reduction must be achieved without including renewable energy generation in the calculation.	Ph 2-5: Architectural Design	DG02.03 GREP	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	Project targeting 5 Star Green Star certification which will achieve better performance than required	Project Energy Modelling Report	ESD	JHA ESD: Energy Modelling Report to be completed as part of Green Star submission deliverables.
Act on climate change	**Passive design** The need for active cooling and heating shall be minimised by employing passive / sustainable design principles listed in DG 55, DG 06.02 and DG 27.12 as well as the GA NSW Environmental Design in Schools Guidelines. This includes: - Window size and shading to prioritise passive cooling in summer and heating in winter - Orientation - Thermal mass - building fabric colour and performance - shading	Ph 2-5: Architectural Design	DG55 DG06.02 DG27.12 GA NSW Environmental Design in Schools	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	Can be achieved with efficient services. Energy modelling report to demonstrate compliance.	Project Energy Modelling report	Head Contractor Architect Electrical Mechanical ESD	
Act on climate change	**Energy efficient lighting design and modelling** - 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, such as diodes and control gear with a long life - Section J part 6 maximum illumination power density provisions must be adhered to, along with all other elements of part 6 - System must support sustainable design principles including reducing energy consumption, such as timed or sensor feedback functionality - Lighting designs should be carried out utilising industry standard lighting design software such as AGI32, Dialux or Relux.	Ph 2-5: Services Design	DG2.3.1 DG63.01 DG63.04 DC63.05 DG63.03.02	DAB c15 GHG Emissions Reduction	**1.** Lighting drawings **2.** Lighting specifications / schedules **3**. Lighting modelling report showing compliant power densities	Y	Electrical drawing to demonstrate energy efficient lighting has been installed	Lighting Schedule	Electrical	JHA Electrical: JHA Electrical has reviewed this item and have no specific concerns at this stage. Targeted credit will be incorporated within detailed design.
Act on climate change	**Lighting control and switching** - The use of lighting controls will assist in substantially improving energy efficiency on sites, and should be considered for all new lighting systems, in new build or site refurbishments. - Lighting control should be simple to operate and adhere to all requirements of DG 63.06 - Constant Light Output and Daylight Harvesting systems are recommended given their ability to reduce lighting energy whilst maintaining comfortably lit spaces. Consideration should be given to these strategies as stipulated in DG 63.06 - 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 - 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. Provisions for energy efficient switching in Schools are outlined within DG63 and DG65.	Ph 2-5: Services Design	DG63.06 DG63.07 DG65.03.01	DAB c15 GHG Emissions Reduction DAB c4 Building Information	**1.** Electrical & lighting drawings showing switching groups and automatic controls **2.** Lighting modelling report showing compliant power densities **3.** Lighting operations and maintenance manual	Y	Electrical & lighting drawings to show compliance	Electrical to incorporate into design	Electrical	JHA Electrical: JHA Electrical has reviewed this item and have no specific concerns at this stage. Targeted credit will be incorporated within detailed design.
Act on climate change	**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 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. Specific requirement are outlined in the EFSG.	Ph 2-5: Services Design	DG2.3.3 DG55	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. **2.** As built mechanical drawings / statement from head contractor; **3.** Whole of life cost analysis demonstrating systems were selected based on WOL performance.	Y	FFE Schedule/receipt to demonstrate compliance	FFE Schedule to show compliance	Head Contractor Architect	
Act on climate change	**Heat loss/gain** The design must take steps to control heat loss from the building during cooler winter months and heat gain during the warmer months. Refer to HVAC Design considerations in DG04.01	Ph 2-5: Services Design	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	Energy model to demonstrate compliance	Project Energy Modelling report	Mechanical/ESD	JHA ESD: Energy Modelling Report to be completed as part of Green Star submission deliverables.
Act on climate change	**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 "traffic light" light system (described in DG 55.01 Thermal Comfort and Indoor Air Quality Policy) should be used to inform users of the suitability of outdoor conditions to utilise natural ventilation.	Ph 2-5: Services Design	DG55 DG 55.01 Thermal Comfort and Indoor Air Quality Policy	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	Project mechanical design to demonstrate controls and as built evidence to show compliance	Mechanical to demonstrate compliance	Mechanical	JHA Mech: JHA Mechanical has reviewed this item and have no specific concerns at this stage. Targeted credit will be incorporated within detailed design.
Act on climate change	**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	Ph 2-5: Services Design	DG2.3.4 DG55	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	Standard SINSW element to have PV system installed	Electrical drawings for the PV system design, Energy Modelling report to include within modelling	Electrical	JHA Electrical: JHA Electrical has reviewed this item and have no specific concerns at this stage. Targeted credit will be incorporated within detailed design.
Act on climate change	**Battery Energy Storage System** A battery energy storage system shall only be designed in consultation with SINSW Sustainability sustainability.enquiries@det.nsw.edu.au	Ph 2-5: Services Design	DG66.8.3	DAB c15 GHG Emissions Reduction; DAB c16 Peak Electricity Demand Reduction	As installed drawings of battery storage system		Not targeting		Electrical	
Act on climate change	**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	Ph 2-5: Services Design	DG56	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	No gas heaters or energy efficient gas heaters	Mechanical to demonstrate compliance	Mechanical	JHA Mech: Reverse cycle AC to provide heating likely to be final option. Where room has works proposed, existing heaters to be removed and should be upgraded per CCP to provide heating.
Act on climate change	**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.	Ph 2-5: Services Design	DG53.09	DAB c15 GHG Emissions Reduction	1. WOL cost assessment for hot water systems 2. Hydraulic drawings/schematics showing installed DHW systems	Y	Hydraulic drawings/schematics showing installed DHW system	Hydraulic drawings	Hydraulic	

Build resilience	**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).	Ph 1: Site Selection and Masterplan	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	Head contractor to provide reports or site survey to demonstrate compliance	detailed reports or surveys	Head Contractor	
Build resilience	**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).	Ph 1: Site Selection and Masterplan	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	Landscape consultant or relative consultant to provide drawing/reports to demonstrate compliance	Bushfire assessment report or plans	Landscape	
Build resilience	**Climate change adaptation** Sites and school communities must be able to withstand natural and urban hazards and adaptively respond to climate change over time, especially for projects involving vulnerable communities e.g. climate generating exacerbated flood, storm surge, inundation, heatwaves, bush fires, extreme storm and other weather events. School facilities must be able to withstand natural hazards and adapt to shocks and stresses to avoid social and economic costs of interrupted operation and repairing or replacing damaged assets. To achieve this, increasing resilience to natural hazards must be considered in the business case development so that associated costs are budgeted. An initial assessment of natural hazards and project vulnerability must be carried out, in consultation with resilience experts, to inform the business case and identify hazards where further analysis is required. The assessment must report on at least two different timescales (2050 and 2070) and consider high emissions scenarios consistent with 2C and 4C for each timescale. The Intergovernmental Panel on Climate Change (IPCC) endorsed emissions scenarios should be used to dictate the assessed scenarios 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.	Ph 1: Site Selection and Masterplan	DG02.08	DAB c3 Adaptation and Resilience	**1.** Climate risk assessment, and **2.** Climate adaptation plan **3.** Emergency management plan	Y	Part of Green Star requirement, assessment and reports to demonstrate compliance	Climate Adaptation Plan and/or Emergency Management Plan	Head Contractor	
Build resilience	**Weather protection** Circulation areas provided between administrative, staff and all student spaces (except Agriculture), should be protected from sun, rain and unfavourable winds.	Ph 2-5: Architectural Design	DG08.05	Not covered in Green Star	As built drawings showing circulation areas are protected as required	Y	Designed to have covered walkways and verandah that demonstrate compliance to this	As built drawing to show compliance	Architect	
Build resilience	**Urban Heat Island Mitigation - Roof Colour** The roof colour will also have an impact on the thermal performance of the roof, therefore the product's Solar Reflectance Index (SRI) should be considered to mitigate the heat island effect. The product selected must meet the following three-year Solar Reflectance Index (SRI) requirements: For roof pitch < 15, minimum SRI of 64 For roof pitch > 15, minimum SRI of 34 Where a three-year SRI is not available, the following requirements must be met: For roof pitch < 15, minimum SRI of 82 For roof pitch > 15, minimum SRI of 39'	Ph 3-4: Product and Material Selection	DG20 Fabric	DAB c25 Heat Island Effect	**1.** Site Plan highlighting all relevant areas as referenced within the area schedule; **2.** 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; and **3.** Supplier Documentation material data sheet for compliant roofing and hardscape materials.	Y	Part of Green Star requirement, architectural plans to demonstrate compliance	Architectural plans to demonstrate compliance	Architect	
Consume responsibly	**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	Ph 7-9: Construction, Commissioning Post Occupancy and Operation		DAS c4 Building Information	**1**. Building user's guide	Y	Head contractor to provide Building User's Guide	Building User's guide	Head Contractor	
Consume responsibly	**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	Ph 1: Site Selection and Masterplan	DG2.4.3	DAB c26 Stormwater	**1.** Stormwater modelling report showing stormwater pollution and flows. **2**. Civil / Hydraulic drawings showing management measures. **3.** Water sensitive urban design report (if WSUD was use4)	Y	Civil to demonstrate compliance	Civil drawings showing management measures	Civil/Hydraulic	
Consume responsibly	**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	Ph 1: Site Selection and Masterplan	DG51.07	GSC c24 Integrated Water Cycle	**1.** Water cycle management study **2.** Evidence that recommendations in the study have been followed / implemented	TBC	Depends on if project has drinking water catchment areas otherwise not applicable		Civil/Hydraulic	
Consume responsibly	**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 in accordance with DG48. Where hazardous materials are found a Hazardous Materials Management Plan should be prepared	Ph 1: Site Selection and Masterplan	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	Head contractor to provide Hazardous Materials Management Plan	Hazardous materials management plan	Head Contractor	

Consume responsibly	**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	Ph 2: Concept Design - Space planning	DG02.7.1	DAB c8 Operational Waste	Operational waste management plan Operational waste reports showing diversion rates	Y	Head contractor to provide Operational Waste Management Plan	Operational waste management plan	Head Contractor	
Consume responsibly	**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.	Ph 2: Concept Design - Space planning	DG21.1.16	Not covered in Green Star	As built drawings or statement by relevant professional	Y	Drawing to demonstrate building flexibility/statement	As built drawing to show compliance	Architect	
Consume responsibly	**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	Ph 2-5: Services Design	DG51.01	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	Letter from Hydraulic to show the sustainability initiatives implemented to reduce potable water consumption	Letter from Hyd	Hydraulic	
Consume responsibly	**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	Ph 2-5: Services Design	DG53.04	DAB c6.0 Metering	**1**. As built hydraulic drawings	Y	As-built hydraulic drawing to show the sub-meters and comply the requirement	Hydraulic drawings	Hydraulic	
Consume responsibly	**Rainwater collection** Include roof water harvesting and tank storage in new schools and 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. The rainwater tanks must be connected to toilets for toilet flushing. If this is not feasible, approval must be granted by SINSW.	Ph 2-5: Services Design	DG53.14 DG2.4.2 DG53.01	DAB c18B.2 Rainwater Reuse	**1.** As built hydraulic drawings showing tank connection to end uses and capacity	Y	Drawing to show tank connection to end uses and capacity	Hydraulic/civil drawings to demonstrate compliance	Civil/Hydraulic	
Consume responsibly	**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.	Ph 2-5: Services Design	DG2.4.2	DAB c18B.5 Fire System Test Water	Fire engineering report	TBC	If sprinkler system is in use for the project, otherwise not applicable	Fire engineering report to demonstrate compliance if sprinkler system is in use	Fire	
Consume responsibly	**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.	Ph 2-5: Services Design	DG53.03	DAB c18 Potable Water	1. Relevant due diligence report / investigation	TBC	Not applicable if ground water is not used for irrigation			
Consume responsibly	**Trade waste** Arrestors for acid, grease, plaster and clay of adequate capacity must be installed to treat wastewater from science laboratories, kitchens, art rooms and canteens as required in DG52.	Ph 2-5: Services Design	DG52	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	Y	Arrestors to be installed where required	Hydraulic design to show arrestors where required	Architect Hydraulic	
Consume responsibly	**Water 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 - Urinals to 5 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. - 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. 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.	Ph 3-4: Product and Material Selection	DG53.02 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	FFE Schedule/receipt to demonstrate compliance	FFE Schedule to show compliance	Head Contractor Architect	
Consume responsibly	**Life cycle assessment (environmental)** Environmental impacts of products and materials has been assessed and inform material selection	Ph 3-4: Product and Material Selection	DG01.03	DAB c19A - Life cycle assessment	Life cycle assessment report		Not targeting			
Consume responsibly	**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.	Ph 3-4: Product and Material Selection	DG01 All design guides for selection of materials and building systems	GSC c20 - Return on Investment	Life cycle costing report for relevant system		Not targeting			

Consume responsibly	**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.	Ph 3-4: Product and Material Selection	DG02.05	DAB c21 Sustainable Products	**1.** Environmental Product Declarations of products / materials used; Product certificates (like GECA, FSC, et3) **2.** Suppliers' declarations confirming recycled contents in products **3.** Bill of quantities	Y	Head contractor to provide Product certificate/statement to demonstrate compliance	Product certificate/statement	Head Contractor	
Consume responsibly	**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.	Ph 3-4: Product and Material Selection	DG2.5.1 DG21.05.01	DAB c20.2 Responsible Building Materials - Timber	**1.** Evidence of chain of custody **2.** Bill of quantities	Y	Head contractor to provide Product certificate/statement to demonstrate compliance	Product certificate/statement	Head Contractor	
Consume responsibly	**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.	Ph 3-4: Product and Material Selection	DG02.07			Y	Head contractor to provide statement to demonstrate compliance	Product certificate/statement	Head Contractor	
Consume responsibly	**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.	Ph 3-4: Product and Material Selection	DG21.02	DAB c19B.1	**1.** Structural specifications and drawings **2**. Structural Engineer's report showing % cement replacement	Y	Contractor to provide structural specifications and drawings to demonstrate compliance	Structural specification	Structural	
Consume responsibly	**Construction waste** Targets must be established to increase diversion of waste sent to landfill, with a minimum diversion rate target of 90%. Consider opportunities for re-use and recycling of materials in the construction phase	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG02.07	DAB c22 Construction and Demolition Waste	Construction waste reports showing percentage (minimum 90%) of waste re-used and recycled (diverted from landfill)	Y	Ccntractor to provide construction waste report that demonstrate compliance	Waste report	Head Contractor	
Consume responsibly	**Maintainability** 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. Any mechanical ventilation system within the building must be designed to provide adequate access for maintenance, to both sides of all moisture and debris-catching components, within the air distribution system. Moisture-producing and debris-catching components include items such as cooling coils, heating coils, fan coil units, humidifiers and filters in the air handling system. The project team should demonstrate that there is a project level review process in place to ensure that the building has been designed as per the EFSG, that any issues identified have been closed out and that the outcomes can be communicated to the relevant facilities/ operations teams Maintenance required and cost of this maintenance are to be considered in assessment of the project's life cycle cost. Operation and Maintenance manuals (O&M Manuals) are to be provided, written in clear, concise English covering the various building elements, assemblies, equipment, service installations and systems incorporated into the Works.	Ph 2-5: Services Design	DG16.10 DG 01.04	DAB c2.1 Services and Maintainability Review DAB c9.1.2 Ventilation System Attributes DAB c4 Building Information	**1.** As built drawings including all equipment access arrangements for maintenance	Y	Head contractor to provide Operation and Maintenance manuals	Operational and maintenance manual	Head Contractor	
Foster 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.	Ph 1: Site Selection and Masterplan	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	Head contractor to provide reports or site survey to demonstrate compliance	Reports or site survey to demonstrate compliance	Head Contractor	
Foster connections	**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. An Ecological Assessment Report must be prepared for the site in order to understand the existing conditions and future conservation strategies. The design of the facilities must provide unique and valuable environmental conservation learning opportunities and effective environmental modelling to the wider community. 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.	Ph 1: Site Selection and Masterplan	DG02.06	DAB c23 Ecological Value GSC c29 Ecological Value (incl Biodiversity Enhancement)	**1.** Biodiversity or ecological assessment / local flora and fauna survey **2.** Ecological Assessment Report which documents the following: - ecological values (current, future, and past) identified for the site and their protection measures - ecological impacts from light and noise pollution and water quality and their mitigation requirements - existing vegetated areas and biodiversity values being retained how biodiversity has been considered within the project's material supply chain - list of management strategies to protect the integrity of ecological values throughout project planning, construction, and occupancy community and local stakeholder expectations including Aboriginal or Torres Strait Islander groups and environmental groups - Adequate due diligence must be conducted where an area of biodiversity or high ecological value is identified on the site, where at least 50% of this area must be retained. **3.** Biodiversity management plan describing measures for the conservation and protection of threatened species or communities, biodiversity enhancement, tree protection, etc. **4.** Evidence demonstrating measures have been implemented to protect and enhance endangered species / ecological communities identified; to preserve or re-establish native flora; etc.	Y	Contractor to provide Biodiversity Management plan that demonstrate compliance	Biodiversity Management Plan	Head Contractor	
Foster connections	**Productive landscape** Consider including opportunities for development of community garden within the site and relationships with community groups for this to occur.	Ph 1: Site Selection and Masterplan	DG2.06	GSC c14.2 Local Food Production	Site plan demonstrating location and size of community garden	TBC	Landscape plans to demonstrate compliance, otherwise lodge departure with SINSW	Landscape to demonstrate community garden, otherwsie departure with SINSW	Landscape	
Foster connections	**Bicycle storage** Provide 1 space for every 20 students to AS2890.3 standard	Ph 2: Concept Design - Space planning	SG552 4.36	DAB c17 Sustainable Transport		Y	Provide bicycle storage as per required	Architectural plans to demonstrate compliance	Architect	

Foster 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.	Ph 2: Concept Design - Space planning	DG16.08 Department of Education's Community Use of School Facilities Implementation Procedures	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	Y	Architect to confirm that direct access has been provided to open space and could comply with this requirement	Architectural plans to demonstrate compliance	Architect	
Foster connections	**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.	Ph 2: Concept Design - Space planning	DG10.03	Not covered in Green Star	Plan view drawings showing provision of open space	Y	Architectural drawings to demonstrate compliance with open play space	Architectural drawings	Architect	
Foster connections	**Staff room** Staff rooms should adequately accommodate staff work and recreation, and focus on indoor environment quality, enjoyment and interaction through provision of the following: •Daylight • Ventilation • Views • Landscaping/Indoor Plants • Acoustic Comfort	Ph 2: Concept Design - Space planning	EFSG Staff Unit	GSI c Amenity Space	**1.** Extracts from the EFSG requirements for staff rooms **2.** Evidence of staff room delivered accordingly	Y	Mechanical drawing to demonstrate the staff rooms are designed as required	Mechanical drawings to demonstrate compliance	Mechanical	JHA Mech: EFSG doesn't make mention of specific ventilation to be provided for staff rooms so compliance to AS1668.2. In addition, AC of staffroom is optional under DG55.
Foster connections	**Reconciliation action plan (RAP)** The project should adopt formalised steps to provide opportunities for Aboriginal and Torres Strait Islander peoples Projects must implement strategies during design, construction and operation that contribute positively towards reconciliation with Australia's first people and address social inequalities within Australia is between Indigenous and non-Indigenous Australians. The project demonstrate a relationship to, and a role in delivering the action items within the Department of Education's RAP. This could include incorporation of Indigenous design strategies and indigenous designers, celebration of indigenous culture on the site through art or landscape, and procurement from indigenous suppliers and workers. Refer to the GA NSW 'Designing with Country' Discussion paper for guidance and examples. The project must adopt all relevant requirements within the NSW Government's Aboriginal Procurement Policy (January 2021)	Ph 2-5: Architectural Design	Department of Education's Reconciliation Action Plan NSW Government Aboriginal Procurement Policy GANSW 'Designing with Country' discussion paper x	DAB c30D Reconciliation Action Plan	**1.** Evidence of the project's relationship with the RAP, e.g. actions implemented in line with RAP, etc.	Y	Head contractor to provide Reconciliation Action Plan	Reconcilation Action Plan	Head Contractor	
Foster connections	**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	Ph 2-5: Services Design	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	Y	School Security Unit to provide Security Services Plans, schedules and forms	Security services plans, schedules and forms	Head Contractor	
Foster connections	**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	Ph 2-5: Services Design	DG64.12.02	GSC c22.2 Digital Infrastructure	**1.** Contracts describing the network infrastructure specification and operational requirements	Y	Head contractor to provide contracts that decribing the network infracture specification and operational requirements	Network contracts	Head Contractor	
Foster connections	**Sustainable Transport Planning / Transport Assessment** Transport planning must prioritise the delivery of feasible, connected networks and rectify transport deficiencies. The S**chool Transport Assessmen**t process must prioritise critical transport infrastructure to satisfy community expectations and statutory planning obligations. The assessment seeks to address school travel demand efficiently, safely and sustainably by maximising the most active and sustainable transport modes and reducing car parking capital expenditure and car travel demand. The School Travel Plan must be developed to inform the design response, construction traffic management, travel plan and post-occupancy operations to meet daily travel demand to school	Ph 1: Site Selection and Masterplan	Schools Transport Practice Note	DAB c17 Sustainable Transport	1. Transport Assessment, which must address: • 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; and • Compliance with the Transport Planning Advisory Note.	Y	Contractor to provide Transport Assessment to demonstrate compliance with this requirement	Transport Assessment	Transport	
Unlock human potential	**Green cleaning** Designs should support the implementation of a Green Cleaning policy for the school, this may include: - Appropriate cleaning areas are to be provided to safely store chemicals and equipment. - Hand washing stations - Use of HEPA filtration in vacuum equipment - Use of materials and surfaces that are easily cleaned - Consideration of operational waste procedures and the safe and simple transfer of waste throughout the school	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	WoG Facilities M	GSP c6 Green Cleaning	**1.** WEB Clean School User Guide **2.** Green Cleaning specifications	Y	Head contractor to provide Green Cleaning specification which complies with this requirement	Green Cleaning Specification	Head Contractor	
Unlock human potential	**Healthy canteen policy** The NSW Healthy School Canteens Strategy applies to all NSW Government schools (primary, secondary and central schools) with a canteen. The school should play a role in encouraging healthy dietary options in an effort to help reduce childhood obesity through food provided in the school canteens. As such, School canteens should be designed to encourage onsite preparation, storage, display and promotion of healthy 'everyday' foods.	Ph 2: Concept Design - Space planning	Department of Education's Healthy Canteen Policy	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.	Y	Head contractor to provide research report behind Healthy Canteen Policy	Develop reports to demonstrate compliance	Head Contractor	

Unlock human potential	**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, tinted glazing, screens, 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.	Ph 2-5: Architectural Design	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	As-built drawing to have eaves/shading to the facades that has direct sunlight	Architectural drawings and/or daylight report	Architect	
Unlock human potential	**Acoustic Performance** Design of internal spaces must address the following Acoustic outcomes: - **Internal Noise Levels** : An internal noise level assessment must be carried out for all new buildings to ensure comfortable acoustic conditions for the spaces occupied. The internal noise levels within the space must meet the limits stipulated in Table 11.06.1 of Section 11.06 Acoustic Performance Guidelines or be within the range stipulated in Table 1 of the AS/NZS 2107:2016 standard. The more stringent of the two should be met. - **Room to room noise control:** Sound insulation must be provided in accordance with the requirements of Table 11.06.2 "Guideline airborne and impact sound insulation requirements" and Table 11.06.3 "Sound insulation requirements (minimum design Rw)" . Doors, walls, operable walls, partitions etc. must meet prescriptive requirements for acoustic separation to provide privacy and comfort within relevant spaces. - **Minimum Speech Transmsion** Index is > 0.60 for Teaching and learning spaces as per Table 11.06.4 - **Reverberation**: Reverberation time is fundamental to describing the 'acoustical liveliness' of a room. The reverberation time within a room must be within the range stipulated in table 11.06.1 of Section 11.6 Acoustic Performance Guidelines or Table 1 of the AS/NZS 2107:2016 standard. The more stringent of the two should be met.	Ph 2-5: Architectural Design	DG 11.06 DG 11.03 DG 11.02	DAB c10 Acoustic comfort	**1.** Report by qualified acoustics consultant demonstrating noise measurements are compliant. **2.** Detailed Drawings indicating sound insulation details and other relevant acoustic design features.	Y	Acoustic report and/or drawings to demonstrate compliance	Acoustic report to confirm compliance with all acoustic requirements	Acoustic	
Unlock human potential	**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.	Ph 2-5: Architectural Design	DG11.04	Not covered in Green Star	1. Report by qualified acoustics consultant	Y	Acoustic consultant to demonstrate compliance	Acoustic consultant to confirm compliance with acoustic design certificate for construction	Acoustic	
Unlock human potential	**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.	Ph 2-5: Architectural Design	DG31.01	Not covered in Green Star	As-built drawings showing fly screening has been provided as required	Y	Fly screens to where required, otherwise not applicable	If these areas are applicable to the proposed development, provide fly screening	Architect	
Unlock human potential	**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.	Ph 2-5: Architectural Design	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	Y	Head contractor to provide photographic or other evidence of signage installed	Signage evidence	Head Contractor	
Unlock human potential	**Access to Views** Building design must ensure that at least 60% of primary occupied spaces have a clear line of sight to high quality internal or external views. The space must be within 8m from the view. 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' Note: Primary Spaces are defined as spaces that where students or staff are expected to work, or remain for an extended period of time, typically longer that 2 hours. This includes classrooms, laboratories, computer labs and office/administration areas.	Ph 2-5: Architectural Design	DG2.10	DAB c12.2 Views	**1.** Views Calculations and Mark-up this must be done in accordance with the GBCA's *Daylight and Views Hand Calculation Guide:* https://www.gbca.org.au/uploads/79/35919/Green%20Star_Daylight%20and%20Views%20Hand%20Calculation%20Guide%20May%202015%20RELEASE.pdf)	Y	Calculations and Mark-up to demonstrate compliance with the requirement	View Calcluations and Markup according to GBCA	Architect ESD	
Unlock human potential	**Access to Daylight** Designers must seek to maximise natural daylight in all learning and administration spaces to improve indoor amenity and create a pleasant environment and reduce energy usage through windows and skylights - Access to high levels of daylight must be ensured for at least 40% of primary occupied spaces per floor. A space is considered to have high levels of daylight if: the space has minimum 160 lux due to daylight during 80% of the nominated hours OR the following requirements are met: No overshadowing – external shading should not impinge on the direct 25 degree line from centre of the window Minimum 40% Visual Light Transmittance (VLT) for building glazing' Note: Primary Spaces are defined as spaces that where students or staff are expected to work, or remain for an extended period of time, typically longer that 2 hours. This includes classrooms, laboratories, computer labs and office/administration areas.	Ph 2-5: Architectural Design	DG2.3.1 DG12	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	Green Star hand calculation and/or daylight modelling	Green Star hand calculation and/or daylight modelling	Architect ESD	12/02/2025, Green Star daylight modelling confirms compliance.

Unlock human potential	**Ventilation and Indoor Air Quality** The maximum Co2 concentration must not exceed **1,500ppm** for more than 20 consecutive minutes in each day 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 support healthy indoor environments, energy efficiency and ease of maintenance. This must also meet requirements for: - Natural ventilation mode and cross ventilation: in line with DG5.01 - 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 design must adhere to DG57.18. - Roof ventilator control: in line with DG65.16 - Wind powered roof ventilators: Designed to suit local ambient climatic conditions to ensure correct sizes, locations and numbers as detailed in DG57.14 - Sanitary Spaces sufficient natural ventilation or mechanical ventilation, to disperse odours and /or humidity in line with - Cross ventilation is to be used where possible. - Provide mechanical ventilation to all Disabled Toilets. - Ventilation in storage spaces in line with DG5.05 - Ventilation in permanent learning spaces and libraries in line with DG55 - Outdoor air requirements and control of Indoor CO2 levels - designs must adhere to DG55.02 - 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. Adhere to ventilation requirements set out in DG57.07. - 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. Adhere to ventilation requirements set out in DG57.09	Ph 2-5: Services Design	DG57.01 DG05.04 DG05.05 DG57.16 DG05.01 DG57.18 DG05.02 DG37 DG65.16 Thermal Comfort and Indoor Air Quality – Performance Brief	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, including indication of windows and cross ventilation	Y	Mechanical design to demonstrate compliance	Mechanical design to incorporate	Mechanical	JHA Mech: Compliance should be easily achievable by following requirements of EFSG.
Unlock human potential	**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. - The Colour Rendering Index (CRI) for light sources must be minimum 80 or higher - Compliance with the uniformity requirements stipulated in Table 3.2 of the AS/NZS 1680 standard should be demonstrated by the presentation of the output from lighting design software. - The Unified Glare Rating (UGR) must be calculated in accordance with the procedure outlined in Clause 8.3.3 of AS/NZS 1680.1:2006 standard, and the calculated value must not exceed the maximum values specified in Table 8.2 of the standard - The maintained illuminance levels must meet the recommended levels as specified in the AS/NZS 1680 standard., and the maintained illuminance values achieve a uniformity of no less than the values given in Table 3.2 of AS 1680.1:2006, with an assumed standard maintenance factor of 0.8. - To ensure flicker-free lighting, the following luminaire requirements should be considered: LED lighting – electronic drivers with 12-bit or greater resolution - Modelling must provide output that clearly demonstrates that the proposed design is compliant with the standards including but not limited to the parameters listed in DG 63.03.02	Ph 2-5: Services Design	DG63.03	DAB c11 Lighting Comfort DAB c11.1 General Illuminance and Glare Reduction	**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	Electrical design to demonstrate compliance with the requirement	Elec drawing	Electrical	JHA Electrical: JHA Electrical has reviewed this item and have no specific concerns at this stage. Targeted credit will be incorporated within detailed design.
Unlock human potential	**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 +/- 1 for 95% of occupied hours	Ph 2-5: Services Design	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	Project targeting 5 Star Green Star, Energy Modelling report to demonstrate compliance	Energy Modelling Report	Mechanical ESD	JHA ESD: Energy Modelling Report to be completed as part of Green Star submission deliverables.
Unlock human potential	**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.	Ph 2-5: Services Design	DG51.09 DG53.11	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.	TBC	Not applicable if no stored hot water	Hydraulic to confirm	Hydraulic	
Unlock human potential	**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.	Ph 2-5: Services Design	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	Electrical drawings indicating the location of all external luminaries	Elec drawing	Electrical	JHA Electrical: JHA Electrical has reviewed this item and have no specific concerns at this stage. Targeted credit will be incorporated within detailed design.
Unlock human potential	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. - Paints, adhesives and sealants must not exceed the maximum VOC limits stipulated in the Green Star Buildings rating tool. - Carpets must not exceed the total VOC limits stipulated in the Green Star Buildings tool.	Ph 3-4: Product and Material Selection	DG2.5.2	DAB c13 Indoor Pollutants	**1.** Product specifications, certificates, safety datasheets that demonstrate low-VOC contents **2.** Bill of quantities	Y	Head contractor to provide product specifications, certificates, datasheets that demonstrate compliance with VOC contents	Product certificate/statement	Head Contractor	
Unlock human potential	**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. The engineered wood products must not exceed the emissions limits stipulated in the Green Star Buildings rating tool. Engineered wood products include particleboard, plywood, Medium Density Fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels. This requirement excludes formwork.	Ph 3-4: Product and Material Selection	DG2.5.2	DAB c13 Indoor Pollutants	**1.** Product specifications, certificates, safety datasheets that demonstrate low-formaldehyde contents Bill of quantities	Y	Head contractor to provide product specifications, certificates, datasheets that demonstrate compliance with formaldehyde contents	Product certificate/statement	Head Contractor	

Unlock human potential	**Acoustic post-occupancy evaluation** ~~Post Occupancy evaluations.~~ Measurements are often undertaken to assess the performance of recently completed or existing facilities. Where ~~a Post Occupancy Evaluation~~ testing 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 must include (as per the above criteria) - Internal noise levels. As per AS 2107:2016 - Room acoustics. Reverberation Time As per AS 2107:2016 - Noise emission. As per AS1055 & NPI (Involving Mech) - Room-to-room acoustics performance. As per AS ISO 140.4 The noise measurement and documentation must be provided by a qualified acoustic consultant and in accordance with AS/NZS 2107:2016 Measurements shall be conducted in at least 10% of regularly occupied spaces.	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG11.07	GSP c10.1 Internal Noise Levels, GSP c10.2 Reverberation, GSP c10.3 Acoustic Separation	**1.** Commitment by SI to conduct acoustic ~~post occupancy evaluation~~ testing	Y	Acoustic report to demonstrate compliance	Acoustic report to confirm compliance with all acoustic requirements	Acoustic	
Unlock human potential	**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	Ph 7-9: Construction, Commissioning Post Occupancy and Operation	DG2.5.3	Not covered in Green Star	Statement by head contractor that no pesticides or termites have been used.	Y	Head contractor to provide statement that no pesticides or termites have been used	Statement of compliance	Head Contractor	
Unlock human potential	**Healthy Places** The design of the project should adress five key principles for Healthy Places, as defined in Green Star Communities credit 9.3. These are: - Walkability - Active and public transport, - Wayfinding -Good public space design - Social interaction	Ph 2-5: Architectural Design	DG2.5.4	Healthy Places [GSC 9.2]	**1.** Narrative providing examples of how each principle is being adressed, with examples from the Masterplan Report and Traffic/Transport Plan	Y	As-built drawing to demonstrate that the design has address the five key principles for healthy places	Architectural drawings to demonstratre compliance	Architect	

APPENDIX B – GREEN STAR MATRIX

Green Star: Design & As Built v1.3 - Credit Recommendations for RHHS

Targeted Rating:	5 Star - Australian Excellence		Design Points	Points TBC/Can be Targeted	5 Star - Australian Excellence
Points Requires	60				60
Design & As Built v1.3 - core credits only			59	0	59
Design & As Built v1.3 - including Innovation credits			69	0	69
Safety Margin					9

Revision : G

SINSW Suggested Points	Design Points
51	59
10	10
61	69

Education
School Infrastructure

Green Star - Design and As Built v1.3 Requirements						SINSW Approach to achieving Green Star Credits								
Category/Credit	Code	Credit Criteria	Points Available	Aim	Compliance requirements	SINSW preferred approach - including pre-approved TQ alternate approaches	Relevant EFSG section or other SINSW guidelines	Example project specific evidence (For Green Star certification all evidence must be accompanied by GBCA submission Template)	SINSW Suggested Points	Design Points	Points TBC/Can be Targeted	ESD Consultant Comments	EFSG Equivalence	Comments/ status
Management			**15**						**10**	**12**	**0**			
Green Star Accredited Professional (GSAP)	1.0	Accredited Professional	1	Recognises projects that engage a GSAP to support the Green Star certification process.	Appoint GSAP at all stages of the project, leading to certification	ESD consultant is engaged at early design and throughout development process to coordinate ESD input in building design	● Sustainability Practice Note ● ESD consultant scope of services	● Letter from PD stating the ESD Consultant fulfilled the role gasp certificate ● ESD consultant outputs (e.g. letters of advice, reports, etc.)	1	1		Green Star requires GSAP engagement from schematic design. May be an issue for current projects starting GS late. If ESD Consultant changes requires handover of documentation from both.	High	
Commissioning and Tuning	2.0	Environmental Performance Targets	Mandatory for this Credit	Recognises commissioning, handover and tuning initiatives for building services to operate at their full potential and as designed.	Set environmental performance targets	SINSW set out environmental performance targets for each school type in SINSW's Environmental Performance Plan. TQ necessary to confirm SINSW alternate approach	● SINSW Environmental Performance Plan	● SINSW Environmental Performance Plan (Populated with project information) ● SI NSW Design Intent Report (Populated with project information)	-	Y		SINSW **Environmental Performance Plan** template available. Design Team to populate **Environmental Performance Plan** and/or **Design Intent Report** with project specific information during Phase 4 - Design Development.	Med	
	2.1	Services and Maintainability Review	1		Conduct a services and maintainability review during design and prior to construction and develop a 'Service and Maintainability Report'	Refer GBCA Response R-14417 - The GBCA has approved an alternative approach where design elements tailored to services and maintainability are incorporated throughout the Educational Facilities Standards & Guidelines (EFSG). The EFSG require all systems to be installed with suitable access for maintenance. Independent design review is undertaken at key design milestones by a technical stakeholder group and/or an expert reference group to ensure adherence to EFSG requirements including maintainability, safety, etc.	● DG 16.10 - Access for Maintenance Project Governance Framework ● Technical Stakeholder Group Practice Note	The project team should demonstrate that there is a project level review process in place to ensure that the building has been designed as per the EFSG, that any issues identified have been closed out and that the outcomes can be communicated to the relevant facilities/ operations teams. ● Expert review group and technical stakeholder group (TSG) meeting minutes ● TSG sign off certificates ● Design Advisory Reports	1	1		During Phase 4 - Design Development, Design Team to complete the **Services and Maintainability Review** template demonstrating project specific input from the design team, the facilities manager and operations staff, including evidence that any issues identified have been rectified and that any actions have been incorporated into the design intent report.	High	
	2.2	Building Commissioning	1		● Prepare commissioning plan and specification ● Conduct air permeability testing	SINSW's Commissioning & Handover Procedure goes above and beyond Green Star requirements. It requires that a Commissioning & Handover Plan is developed including all key systems in the scope.	● Commissioning & Handover Procedure	● Project Commissioning & Handover Plan ● Air tightness test result and witnessing confirmation	0			Green Star requires air permeability testing which is not conducted for SINSW projects. Not recommended due to the additoanl costs of air permeability testing.	Low	
	2.3	Building Systems Tuning	1		Commit to a tuning process for all nominated building systems including: ● quarterly adjustments ● measured first 12 months after occupation ● review of manufacture warranties	Not currently addressed in SINSW D&C construction contracts		● Building Tuning Commitment or contract demonstrating that there is a requirement for a building tuning process	0	1		Currently not in D&C contracts and may require a variation to the head contractor **[15/03/23]** Point to be included. Requirements to be included in Tender Specs	Low	
	2.4	Independent Commissioning Agent (ICA)	1		● Appoint an ICA from schematic design	At construction and commissioning phases, the Commissioning & Handover Procedure requires comprehensive inspection, witness testing and validation. Refer **GBCA Response R-14422** - The GBCA has confirmed the SI NSW process can be adopted in lieu of a separate ICA	● Commissioning & Handover Procedure	• Evidence outlining the purpose, role and responsibilities of the Commissioning and Temporary Schools Program Team. • CVs demonstrating that the team are suitably qualified commissioning professionals. • Evidence demonstrating that the Commissioning and Temporary Schools Program Team is independent from the design team and that they are engaged on each project.	1	1		As per GBCA Response R-14422, projects within the Schools Infrastructure NSW Umbrella (GS-6039DA) may use the Commissioning and Temporary Schools Program Team in lieu of engaging a dedicated independent commissioning agent (ICA). SINSW to provide evidence that the Commissioning and Temporary Schools Program Team has been engaged as the project's commissioning team. Campus-wide credit	High	
Adaptation and Resilience	3.0	Implementation of a Climate Adaptation Plan	2	Recognises projects that are resilient to the impacts of a changing climate and natural disasters.	Engage a qualified professional to prepare a project-specific Climate Adaptation Plan (CAP) and implement recommendations into the design and construction.	Site selection is informed by Eagle Eye or XDI Systems which are tools that identify bushfire, landslide, flooding and drought risks. The EFSG require consideration to how school communities will be able to adaptively respond to climate change over time, especially flood, storm surge, inundation, heatwaves, bush fires and extreme weather events.	● DG 03.02 - Site Investigations ● DG 13 - Bushfire Protection ● DG 02.08 - Climate Change Adaptation ● ESD Consultant scope of services	Climate adaptation plan	2	2		Consider standardising approach to climate change design responses to ensure consistency of approach and eliminate credit risk. **[15/03/23]** Climate Risk Register to be finalised, inclusive of site specific responses.	High	
Building Information	4.0	Building Information	1	Recognises projects that make available building information that facilitates understanding of building systems operation and maintenance requirements, and their environmental targets for optimised performance	● Provide operations and maintenance (O&M) information and log book to facilities management team and stakeholders, and ● Provide building user information to all relevant stakeholders	The EFSG require a building user's guide is developed and the Commissioning & Handover Procedure requires on-site training is provided to staff as well as handover of manuals, as built and warranties. SINSW has developped a template that can be populated to develop a school specific Building User's Guide. Refer GBCA Response R-15394 - The GBCA has confirmed FMWeb can be used in lieu of Building Log Book. GBCA Response R-14554 confirms that the Whole of Government Facilities Management Services (Maintenance) contract can be used in lieu of confidential documents for the operations and maintenance information (if necessary)	● DG 64.10 - Manuals and Training ● DG 65.02 - Energy Conservation ● DG 16.10 - Access for Maintenance ● Commissioning & Handover Procedure	• Template SI NSW Building User Information ● Project specific manuals, as-builts, warranties, etc. ● AMS online portal pdf	1	1		As per GBCA Response R-15394, in lieu of Building Log Book, compliance with 4.1.2 is achieved by demonstrating that the buildings asset maintenance information is captured through the NSW Government FMWeb Maintenance platform. Contractor is responsible for providing **Operations and Maintenance Information** in accordance with 4.1.1 & **Building User Information** in accordance with 4.1.3.	Med	
Commitment to Performance	5.1	Environmental Building Performance	1	Encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance.	Set, measure and report for at least 2 building performance metrics i.e. energy, water, waste and IEQ	SINSW monitor energy and water performance of schools and report annually for GREP. Energy efficiency programs are developed based on this monitoring. TQ necessary to confirm SINSW alternate approach		● ERM Power customer online portal ● Principal's Dashboard ● GREP annual reports ● SINSW Environmental Performance Plan	1	1		SINSW has provided standard Commitment to Environmental Performance letter for schools.	Med	
	5.2	End of Life Waste Performance	1		Commitment to extend the life of the interior fit out or finishes to at least ten years.	Life of interiors in schools extend further than 10 years. The EFSG specify materials and systems that have proven durability. TQ necessary to confirm SINSW alternate approach	● EFSG multiple specifications ● DG 40 - Materials and Finishes	- Commitment letter from AMU Executive Director	1	1		SINSW has provided a End of Life Waste Performance Letter template for schools. Campus-wide credit	Med	
Metering and Monitoring	6.0	Metering	Mandatory for this Credit	Recognises the implementation of effective energy and water metering and monitoring systems	Install accessible meters to monitor building energy and water consumption. Meters must comply with the current National Measurement Regulations and NABERS rating protocol	EFSG requires whole site electricity metering and some water submetering. Sub-metering as required in the credit is excessive for schools. TQ necessary to confirm SINSW alternate approach	● DG 53.04 - Metering Supplies	● As built electrical and hydraulic drawings	-	Y		Metering, monitoring and BMS requirements for schools are currently being reviewed. In line with Section J8 there will likely be two different metering and monitoring requirements dependant on size of building/school. Once completed, TQ for alternate approach may be developed.	Low	**[29/06/2022] JHA-Elec:** Achievable with Minimal cost implication
	6.1	Monitoring Systems	1		Auto monitoring system to capture, process and present data	No SINSW approved monitoring system. The role of building manager does not exist in schools.			0	1		An automatic monitoring system that records both consumption and demand of energy and water required to achieve credit. Can be achieved at additional costs.	Low	**[29/06/2022] JHA-Elec:** Achievable with Minimal cost implication
Responsible Building Practices	7.0	Environmental Management Plan (EMP)	Mandatory for this Credit	Rewards responsible construction practices that manage environmental impacts, enhance staff health and wellbeing, and improve sustainability knowledge on site	Develop and implement a best practice EMP	An EMP is required for all SINSW contracts	● GC21 provisions	● Contract EMP	-	Y		Head Contractor must develop & implement a project-specific best practice EMP.	High	
	7.1	Formalised Environmental Management System	1		A responsible party for the site has a formalised approach to planning, implementing and auditing is in place during construction, to ensure conformance with the EMP	ISO14001 accredited EMS contractors required	● NSW Government construction scheme	● Head contractor's ISO certificate	1	1		Head Contractor must have ISO14001 accredited EMS. Campus-wide credit	High	
	7.2	High Quality Staff Support	1		Promote mental and physical health of staff and train up in sustainability practices through on-site, off-site and/or online classes	Not in GC21 contract.		- commitment from head contractor	0			Not recommended in the first instance but could be targeted if Head Contractor has "high quality staff support practices" in place. Campus-wide credit	Low	

Operational Waste	8A	Performance Pathway	1	Recognises projects that implement waste management plans that facilitate the re-use, upcycling, or conversion of waste into energy, and stewardship of items to reduce the quantity of outgoing waste.	Qualified waste auditor prepares and Implements an Operational Waste Management Plan (OWMP) which is then reflected in design of building facilities	Can do either option School Operational Waste Management Plans are required. SSD projects can amend their Waste Management Plans accordingly.	● DG 02.07 - Waste Management	● School waste management plan	-			Waste consultant required to prepare and implement an Operational Waste Management Plan (OWMP) for the project.	High	Waste Consultant not engaged in favour or prescriptive pathway
	8B	Prescriptive Pathway	1		Project team to comply with the following: ● separation of waste streams ● dedicated waste storage area ● access to waste storage areas must adhere to best practice	Can do either option EFSGs require waste storage areas are included, with the provision of space for the separation of waste and receptacles for multiple waste streams. Safe methods for vehicle access and the transfer of waste must also be considered.	● DG 02.07 - Waste Management	● As built architectural drawings ● Schedule of accommodation	1	1		**[27/04/23] JHA-ESD:** Operational Waste Mangement Plan template by Hill Shire to be completed. To be reviewed against credit requirements	High	
Indoor Environment Quality			**17**						**12**	**11**	**0**			
Indoor Air Quality	9.1	Ventilation System Attributes	1	Recognises projects that provide high indoor air quality to occupants.	● Minimise outdoor air pollutants ● Design HVAC for ease of maintenance ● Clean prior to occupation ASHRAE Standard 62.1:2013 is referenced	The EFSG require ventilation systems are designed for ease of maintenance and to 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 62.1. Cleaning is a commissioning requirement.	● DG 55.02 - Thermal Comfort and Indoor Air Quality Performance Brief ● GC21 Contract - Preliminaries ● Commissioning and Handover Procedure	● As built mechanical drawings ● Confirmation of cleaning by head contractor	1	1		Mechanical consultant must ensure the HVAC system is compliant with this credit.	Med	**[01/07/2022] JHA-Mech :** No Concerns, Maintenance requirements for ducted FCUs per exception as discussed directly
	9.2	Provision of Outdoor Air	2		● 1 point - Outdoor air is provided at a rate 50% greater than min required by AS 1668.2:2012 or maintain CO_2 concentrations below 800ppm ● 2 points - Outdoor air is provided at a rate 100% greater than min required by AS 1668.2:2012 or maintain CO_2 concentrations below 700ppm ● Naturally ventilated spaces must meet the requirements of AS 1668.4-2012	Schools are naturally ventilated most of the time and only when climate is not appropriate mechanical systems are operated (a traffic light system is used to control this). Provision of outdoor air required in the EFSG is in accordance with requirements of AS 1668.2.	● DG 55.02 - Thermal Comfort and Indoor Air Quality Performance Brief	● As built mechanical drawings ● Commissioning report	0		0	1 point is available if outdoor air is provided at a rate 50% greater than min required by AS 1668.2:2012 or maintain CO2 concentrations below 800ppm. **Note**: this requirement is mandatory under the current Green Star tool, which means this will have to be included in new schools registered under Green Star Buildings v1. Not mandatory for this project as it has been registered for Green Star DAB v1.3 but should be considered for its benefits. **[15/03/23]** Point Removed moved to desireable pending review from SINSW and cost planner **[20/05/2024] SINSW:** Point to not be targeted	Low	**[15/07/2022] JHA-Mech :** One point for 50% above AS1668.2 requirements is possible with an estimated mechanical cost uplift of **15%**. Heat exchangers to facilitate the additional outside air would require 650mm ceiling space, including provisions for acoustic enclosures. Increasing ventilation rate to 100% above AS1668.2 requirements is not recommended.
	9.3	Exhaust or Elimination of Pollutants	1		Sources of pollutants (printing, photocopying, cooking and vehicle) compliant with minimum emissions standards or be exhausted directly to outside	The EFSG contain provisions for exhaust or elimination of pollutants for multiple spaces, incl printing rooms and kitchens	● DG 57.07 - Duplicating / Printing Room Ventilation ● DG 57.08 - Fume Cupboard - Single Side or Double Side ● DG 57.09 - Chemical Store Ventilation ● DG 57.16 - Toilet and Change Room Ventilation ● DG 57.17 - Laundry	● Product data sheets or certificates of emissions compliant MFDs ● As built mechanical drawings - SINSW Printing processes cover letter	1	1		SINSW have purchase contract in place with FUJIFILM in provide low emission printers and photocopiers to all schools. FAQ-F-00269 and FUJIFILM Low Emission Certificates	High	**[01/07/2022] JHA Mech:** No concerns. Exhaust per EFSG as noted.
Acoustic Comfort	10.1	Internal Noise Levels	1	Rewards projects that provide appropriate and comfortable acoustic conditions for occupants.	● Internal ambient noise levels no more than 5db(A) above lower figure in table 1 of AS/NZA 2107:2016 ● Compliance shall be demonstrated through measurement provided by a qualified acoustic consultant	The EFSG set acoustic performance requirements for the different spaces, including noise levels, reverberation and acoustic separation. These requirements are best practice for schools.	● DG 55.02 - Thermal Comfort and Indoor Air Quality Performance Brief (noise levels from HVAC) ● DG 11.07 - Acoustic post occupancy evaluation	● Detailed drawings ● Acoustic report ● Commissioning report ● Acoustic post occupancy evaluation	1	1		Acoustic Consultant to ensure compliance with this credit	High	
	10.2	Reverberation	1		● Reverberation time below max stated in table 1 of AS/NZS 2107:2016 ● Compliance shall be demonstrated through measurement		As above		1	1		Acoustic Consultant to ensure compliance with this credit	High	
	10.3	Acoustic Separation	1		Reduce noise transmission between enclosed spaces Rw of at least 35 for partitions with doors and at least 45 for partitions without a door	Note (Rw) from 30 to 35 for glazed operable walls between enclosed spaces only. (Refer GBCA response R-14412)	● DG 11.05 - Room to Room Noise Control		1	1		Acoustic consultant to ensure compliance with this credit, noting for **glazed operable walls** between enclosed spaces, sound reduction index (Rw) of 30 (instead of 35) applies (Refer GBCA response R-14412).	High	**[03/07/2022] DJRD:** Rw30 glass sliding door is likely to be achievable. Rw 35 and greater may not be available on the market
Lighting Comfort	11.0	Minimum Lighting Comfort	Mandatory for this Credit	Recognises well-lit spaces that provide a high degree of comfort to users	Lights in the nominated area (all primary and secondary spaces) are Flicker-free lights and min Colour Rendering Index (CRI) of 80	The EFSG include best practice provisions for lighting comfort, illuminance levels, glare reduction, surface illuminance and lighting controls. Modelling is required to inform design and demonstrate outcomes.	● DG 63.03 - Lighting Design ● SG951 - Lighting Specification	● Lighting drawings ● Architectural drawings ● Lighting specifications / schedules ● Isolux drawings	-	Y		Electrical consultant to ensure compliance with this credit.	High	**[29/06/2022] JHA-Elec:** Achievable with Minimal cost implication
	11.1	General Illuminance and Glare Reduction	1		● Lighting levels and quality comply with the GBCA best practice guidelines and ● Glare is reduced				1	1		Electrical consultant to ensure compliance with this credit.	High	**[29/06/2022] JHA-Elec:** Achievable with Minimal cost implication
	11.2	Surface Illuminance	1		Combination of lighting and surfaces improve uniformity of lighting				1		0	Requires plain ceiling to achieve uniform surface reflectance of at least 0.75. Architect to confirm if this credit is to be targeted. If targeted, Electrical consultant to ensure ceiling area has an average surface illuminance of at least 30% of the lighting levels on the working plane via direct/indirect lighting system. **[15/03/2023]** Point not targeted	High	**[29/06/2022] JHA-Elec:** Achievable with Minimal cost implication **[03/07/2022] DJRD:** Mineral fibre acoustic ceiling tiles may not achieve the required surface reflectance
	11.3	Localised Lighting Control	1		Occupants are be able to control the lighting in their immediate environment Example of immediate environment: ● open-plan office - light shone on the workstation ● residential unit - light hitting the work surface in the kitchen where food is prepared	Not in EFSG. This Green Star requirement is not relevant to classrooms but other spaces may have localised control.			0		0	School projects can be suited to having indiviudal lighting control in nominated spaces. Would require dimming functionality to target. Dimming not proposed currently. EFSG DG 63 includes requirement for local scene control which meet credit requirement. **[15/03/2023]** Point not targeted	Low	**[29/06/2022] JHA-Elec:** Achievable with Minimal cost implication
Visual Comfort	12.0	Glare Reduction	Mandatory for this Credit	Recognises well-lit spaces that provide high levels of visual comfort to building occupants.	Reduce glare through a combination of blinds, screens, fixed devices, or other means	The EFSG require daylight glare controls are implemented on exposed facades subject to direct sunlight. Specifically, external window shading.	● DG 12 - Light - Natural ● DG 07 - Sun Control ● DG 2.3.1 - Energy Conservation (shading devices)	● Architectural drawings	-	Y		Architect to ensure compliance with this credit.	High	
	12.1	Daylight	2		● 1 point - 40% of the nominated area (all primary spaces) receives high levels of daylight ● 2 points - 60% of the nominated area (all primary spaces) receives high levels of daylight	The EFSG require to maximise natural daylight in all habitable spaces to improve indoor amenity and create a pleasant environment.	● DG 2.3.1 - Lighting ● DG 12 - Light - Natural	● Daylight modelling report	1	1		ESD consultant to undertake Daylight Autonomy modelling to confirm compliance with this credit during Phase 4 - Design Development. **[12/02/2025]** - Daylight modelling result shows 40.8% compliance.	High	**[03/07/2022] DJRD:** Design standard hubs do not allow architect to modify building footprint
	12.2	Views	1		60% of the nominated area (all primary spaces) has a clear line of sight to a high quality internal or external view ● External View – A high quality external view must extend to the outside towards natural elements such as large bodies of vegetation, a body of water, frequent movement of (people, vehicles, or animals) or sky ● Internal View - A high quality internal view is defined as a view towards an area that is landscaped or contains a water feature, or an atrium	This is not explicitly required in the EFSG but 100% achievable based on typical room design, window location and quality landscaping in new schools.	● DG 90 - Landscape Design	● Landscape design report ● Architectural drawings ● Short Report / calculation	1	1		ESD consultant to finalise Views calculation to confirm compliance with this credit during Phase 4 - Design Development.	High	**[03/07/2022] DJRD:** JHA to provide more detail of requirement
Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	Recognises projects that safeguard occupant health through the reduction of internal air pollutant levels.	● No paints, adhesives, sealants or carpets are used in the building; or ● 95% of all internal paints, adhesives, sealants and carpets meet total VOC limits	The EFSG require low VOC and formaldehyde content in line with Green Star requirements.	● DG 2.5.2 - Low VOC	● Materials specifications	1	1		All consultants to ensure their specifications comply with credit requirements. Campus-wide credit	Med	**[01/07/2022] JHA-Mech :** No Concerns
	13.2	Engineered Wood Products	1		● No new engineered wood products are used in the building; or ● At least 95% of all engineered wood products meet formaldehyde emission limits		● DG 2.5.2 - Low VOC	● Materials specifications	1	1		All consultants to ensure their specifications comply with credit requirements. Campus-wide credit	Med	
Thermal Comfort	14.1	Thermal Comfort	1	Recognises projects that achieve high levels of thermal comfort.	80% of occupants satisfied - equivalent to PMV between -1 and +1	Schools are naturally ventilated except when outside climate is not adequate. Inclusion of active cooling is directed by DoE's thermal comfort policy. The EFSG require thermal comfort is automatically controlled within specified parameters. Thermal modelling is undertaken to demonstrate that learning spaces and libraries have been designed to achieve a predicted mean vote (PMV) of +/- 1 for 95% of occupied hours	● DG 55.02 - Thermal Comfort and Indoor Air Quality Performance Brief	● Drawings ● Thermal comfort modelling report	1	1		ESD consultant to undertake PMV modelling to confirm compliance with this credit during Phase 4 - Design Development. **[08/07/2022]** - To check with Mech consultant if all areas will be provided with AC i.e Staff areas	Med	**[15/07/2022] JHA-Mech** : Recommended that staff rooms **to be conditioned**.
	14.2	Advanced Thermal Comfort	1		90% of occupants satisfied - equivalent to PMV between -0.5 and +0.5				0				Low	

Energy			**22**						**5**	**7**	**0**			
Greenhouse Gas Emissions	15E.0	Conditional Requirement: Reference Building Pathway	Mandatory for this Credit and Certification	Encourages energy efficient buildings and the reduction of greenhouse gas (GHG) emissions associated with the use of energy in building operations.	Projects targeting: ● 4 Star - Proposed building must achieve 10% improvement on NCC Section J reference building. Equivalent to GBCA Benchmark Building ● 5 Star - Minimum points threshold = 3 points ● 6 Star - Minimum points threshold = 6 points	The EFSG require 'energy consumption is predicted to be at least 10% lower than if build to minimum compliance with National Construction Code requirements'. To comply with 15E energy modelling must be completed.	● DG 02.03 - Energy Conservation	● Section J modelling report	-	Y		ESD consultant to undertake energy modelling to confirm compliance with this credit during Phase 4 - Design Development, without including renewable energy generation in the calculation. All services consultant to provide at least 10% improvement in energy efficiency compared to the minimum requirements in NCC Section J for their respective services.	High	
	15E.1	Reference Building Pathway	20		Points awarded for emissions reduction: ● Building fabric relative to NCC Section J to Reference Building - 1 point for 5%, 2 point for 10%, 3 point for 15%, max. 4 point for 20% ● Proposed building relative to GBCA Benchmark Building - 1.6 point for 10%, 3.2 point for 20%, 4.8 point for 30%, 6.4 point for 40% etc.	The EFSG require a number of measures for reduced energy consumption including: - Passive design (building envelope, orientation, daylighting, insulation, etc.) - Energy efficient air conditioning, ventilation and lighting systems - Solar PV (large systems up to 100 kW) Six points are conservatively estimated based on the above and Green Star benchmarking done for SINSW projects - 6% Greenpower requirement in Whole of Government Electricity Contracts	● DG66 - Photovoltaic Solar Power Generator ● DG 02.03 - Energy Conservation ● DG 65.02 - Energy Conservation (special electrical systems) ● DG 12 - Light - Natural ● DG 07 - Sun Control ● DG 63 - Lighting ● DG 65.03 - Automatic Lighting Control ● DG 55 - Cooling Policy (energy efficient AC)	● Energy modelling report	4	6	0	It is anticipated that SINSW projects should be able to achieve at least 4 points, with possibility to achieve 2 additional points to be confirmed with energy modelling. ESD consultant to undertake energy modelling to confirm points achievable under this credit during Phase 4 - Design Development.	High	**[01/07/2022] JHA-Mech :** Comfort modelling per ESD **[14/04/2023] JHA-Elec.** Project inclusive of 70kW system.
Peak Electricity Demand Reduction	16B	Performance Pathway - Reference Building	2	Encourages the reduction of peak demand load on the electricity network infrastructure.	Project's predicted peak electricity demand has been reduced below that of a Reference Building: ● 1 point - 20% reduction ● 2 points - 30% reduction	The EFSG require installation of PV systems. Batteries may be installed if substantiated	● DG66 - Photovoltaic Solar Power Generator Guidelines ● SG933 - Schedule of Photovoltaic Solar Power Generator	Energy modelling report	1	1		ESD consultant to undertake peak demand modelling to confirm compliance with this credit during Phase 4 - Design Development.	Med	
Transport			**10**						**10**	**10**	**0**			
Sustainable Transport	17A	Performance Pathway	10	Rewards projects that implement design and operational measures that reduce the carbon emissions arising from occupant travel to and from the project, when compared to a reference building. This also promotes the health and fitness of commuters, and the increased liveability of the location. note: Typically projects are expected to gain more points using the 17A pathway. However if projects cannot comply with 17A, the prescriptive pathway may be applied.	● GBCA response R-14426 accepts the SINSW School Transport Planning Process as an alternative to standard Green Star Requirements for Credit 17- Performance Pathway ● Transport Plans undertaken for all SINSW project must follow the SINSW School Transport Planning process outlined in the Practice Note: School Transport Planning. This Practice note is available to project teams on T-Reign.	BN AMD21/289 approved by Chief Exec April 2021 approved the use of the SINSW School Transport Planning Process for all infrastructure upgrades . Transport planners must be engaged in the master planning phase and in the ongoing design development phases noting that Transport Plans are an environmental assessment and planning approval requirement. The BN states that Transport Plans will be undertaken as per the School Transport Plan Practice note.	● SEARs/ Planning approval requirements ● T-Reign Practice Note 16: SINSW Transport Planning Document pack ● Exec approval for provided in BN AMD21/289 available in T-Reign document Pack.	SINSW Schools Transport Assessment Process outcomes including: • A summary of the project specific School Travel Plan. • A copy of the Transport Assessment template and evidence that the School Transport Plan framework has been completed as per the template including excerpts from the Plan documenting; transport goals, policies and procedures, information on the school transport operations. the communications plan, the collection of data and monitoring and adherence to the governance framework. • Evidence documenting the consultation process i.e. excerpts from meeting minutes, actions and amendments to the transport assessment/ school travel plan. • Evidence that the School Transport Plan has been implemented and that the recommendations made in the Plan have/ will be reflected in the design of the building's facilities, ongoing operational processes and communications. • A verification from the Project Applicant/ Transport Project Director that the transport assessment and plan has been delivered as per the EFSG and 'Transport Assessment: Template'. • A copy of the GBCA technical question response ● Architectural drawings	10	10		Under SINSW Umbrella may target 10 points according to R-14426. Project team to complete **SINSW Transport Assessment template** during Phase 4 - Design Development. Campus-wide credit **[18/04/23] -** Submission guidelines provided to Stantec to ensure transport plan meets requirements **[14/01/25]** - current "Transport Impact Assessment" (TIA) is not sufficient enough to meet credit requirements under SINSW pathway. A separate scope of "School Travel Plan" is required by the head contractor to fulfil the scope.	High	
Water			**12**						**5**	**6**	**0**			
Potable Water	18A	Performance Pathway	12	Typically projects are expected to gain more points using the 17A pathway.	Completion of the Green Star Potable Water Calculator that awards points based on water saving in comparison with a reference building.	EFSGs require a number of initiatives to reduce potable water consumption. This includes rainwater harvesting, water efficient fixtures and fittings, drought tolerant vegetation for landscaping, etc. The calculator will reward points by developing a annual water usage estimate for the reference case and for the proposed school. It is recommended both the performance prescriptive pathways are considered to see which one gives more points.	● DG 53 - Water ● DG02 2.4.1 - Water Conservation ● DG 51.01 - Hydraulics	● Hydraulic drawings ● Schedule of Fixtures ● WELS certificates or Manufacturers information ● Potable water calculations using GBCA water calculation tool	5	6		R-14547 Performance Pathway Desirable. SINSW projects able to achieve more points but 5 points is considered a conservative estimation. **[28/06/2022]:** Performance Pathway Desirable. 6 Points targeted but potentially more could be claimed depending on reduction achieved.	High	**[28/06/2022] JHA-Hyd: Site subject to benefit from Rouse Hill Water Recycling Scheme** **[23/03/2023] JHA-Hyd:** 2 x 5kL RW tank specified. **[20/01/25] JHA-ESD:** RW tank updated to 1 x 10kL
Materials			**18**						**2**	**3**	**4**			
Life Cycle Impacts	19B.1	Concrete	3		Requires reduced use of: ● Portland cement content by at least 30% ● potable water by at least 50% replacement with recycled or reclaimed water. ● course aggregate by 40% or fine aggregate by 25%	EFSG recommend fly ash can be used in concrete mixes. This is a procurement decision that varies across projects.	Not currently supported by EFSG ● DG 21.02 - Concrete ● SG314 Concrete- Insitu	Structural Specifications, drawings, Engineers report including: ● Summary calculation for the product replacement ● Identifying all water or coarse or fine aggregate uses in the project and demonstrating how the Credit Criteria is met. ● Concrete suppliers submission detailing target mix designs for each product supplied.	0	1	2	**[15/03/2023]** JHA-ESD & Enstruct to review if further points can be claimed	Low	**[12/07/2022] Enstruct** : From a structural perspective the use of cement replacement products is feasible for reinforced concrete designs. Allowance for future building material price fluctuations must be included in the cost plan. **[29/05/2023] Enstruct:** Credit criteria 19B.1.2 and 19.B.1.3 are also feasible and dependent on the final mix design.
	19B.2	Steel	1		Requires reduced use of steel in framing or reinforcement. This can be demonstrated by a reduction of at least 5% in the mass of steel. For framing this can also be achieved by replacement with high strength steel.	Not required in EFSG. This is a procurement decision that varies across projects.		Evidence relevant to the reduction targeted , may include: ● Structural Engineer's or Quantity Surveyors Report demonstrating the reduction in mass of structural steel framing or reinforcing steel in the building. ● Summary of steel quantities produced by BIM model. ● Drawings supporting claims of optimal fabrication techniques. ● Quantities (by mass) of structural and reinforcing steel as percentages of the total steel products installed in the building (structural steel and reinforcing steel only). ● Total cost of new steel specified in the project against the project's total contract value and the percentage (by mass) of structural steel framing and steel reinforcement summarised in a report by the Quantity Survey, Project Manager, Cost Planner or other qualified professional.	0		1	Not targeted for this project. **[15/03/2023]** JHA-ESD & Enstruct to review if further points can be claimed	Low	**[12/07/2022] Enstruct** : If this point is targeted for the project a quantity comparison can be provided from the structural BIM.
	19B.3	Building Reuse	4		Can be targeted when a percentage of the building façade or structure is retained.	Not required in the EFSG but typically facades and structure are retained in refurbished buildings.	● Decision at master planning to understand eligibility	●Demolition and site drawings indicating the structures on site at time of purchase/ previous condition of site **(see TQ R-14474)**, Drawings showing the extent of retained structures and façades (demonstrated by proportion of vertical area for facades and by mass of existing structure for structure reuse).	0			Not applicable for SINSW projects. Only new buildings are seeking formal certification.	Med	
	19B.4	Structural Timber	3		Requires a minimum 30% of the building's structure by GFA to be responsibly sourced structural timber. All structural timber must hold either FSG or PEFC certification. Points awarded based on % included.	Not required in EFSG. This is a procurement decision that varies across projects.	Certification covered in the EFSG ● DG02 2.5.1 Timber ● SG381 Timber-Structural	● Product Certification certificates	0			Nor applicable unless project pursue CLT construction.	Low	
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	Rewards projects that include building materials that are responsibly sourced or have a sustainable supply chain.	Requires 95% of the buildings steel is sourced from a responsible steel maker . There are additional requirements depending on whether the building is steel or concrete framed.	Not required in EFSG but typically steel from responsible manufacturers is procured.		● Bill of Quantities or similar report from qualified professional. ● Structural drawings/specification ● Evidence supplier is a responsible steel maker	0			Feedback on recent projects is the cost of compliant steel is much more expensive. Campus-wide credit	Low	
	20.2	Timber Products	1		95% (by cost) of all timber used is certified or reused	The EFSG require that only sustainable timber is procured	● DG02 2.5.1 - Sustainable Materials (timber)	● Bill of Quantities or similar report from qualified professional. ● Invoices quoting chain of custody code	1		1	Compliant timber with chain of custody code may be difficult/costly to source. Hence not recommended but point could be targeted. Campus-wide credit **[15/03/2023]** Point not targeted. Contractor to review if viable	High	
	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1		Requires that only sustainably produced PVC is used	Not required in EFSG. This is a procurement decision that varies across projects.		● Bill of Quantities or similar report from qualified professional. ● Evidence of best practice product certification and data sheets ● Invoices	0	1		All consultants to ensure their specifications comply with credit requirements. Campus-wide credit	Low	**[29/06/2022] JHA-Elec:** Achievable with minor cost implication
Sustainable Products	21.0	Product Transparency and Sustainability	3	Encourages sustainability and transparency in product specification.	Requires a proportion of all materials used in the project to meet transparency and sustainability requirements. Points awarded based on % of compliant product used.	The EFSG encourage the use of sustainable materials. This is a procurement decision that varies across projects.	● DG02 02.05 - Sustainable Materials	● Evidence of project cost, and cost of certified products from qualified professional. ● Product certification certificates or stewardship contracts.	0				Low	
	22.0	Reporting Accuracy	Mandatory for this Credit	Rewards projects that reduce	All waste contractors and waste processing facilities that provide waste management and reporting services must demonstrate compliance with *Green Star Construction and Demolition Waste Reporting Criteria*		● GC21 ● DG 02.07 Waste Management ● DG02 2.7.1 Construction and demolition waste	● Compliance Verification summaries and Disclosure Statement from waste contractors ● C&D waste report including demolition or site drawings and cumulative waste report. ● Environmental Management Plan	-	Y		Head Contractor to ensure compliance with this credit. Campus-wide credit	Med	

Construction and Demolition Waste	22A	Fixed Benchmark		Rewards projects that reduce construction waste going to landfill by reusing or recycling building materials.	90% of construction and demolition waste generated to be diverted from landfill or Less than 10kg/m^2 of GFA goes to landfill	GC21 construction contract contains provisions to minimise construction and demolition waste. DG 2.7.1 requires minimum diversion rate target of 90%/			0				Low	
	22B	Percentage Benchmark	1						1	1		Head Contractor to ensure compliance with this credit. Campus-wide credit	High	
Land Use & Ecology			**6**						**3**	**2**	**0**			
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	Mandatory for this Credit	Rewards projects that improve the ecological value of their site.	No critically endangered or vulnerable species or ecological communities were present on site at the date of site purchase or option contract	Ecologist report confirming no issues of concern present onsite. Or option for DA/SSD projects only - conditions showing site not subject to approval under the EPBC act	• DG 02.06 - Ecological Conservation	• Biodiversity and ecology studies • Arborist studies • Landscape drawings	-			NA. Not required unless Credit 23.1 is targeted. Campus-wide credit	High	
	23.1	Ecological Value	3		Requires improving ecological value of the site	The EFSG contain requirements ecosystem protection and an Ecology and Biodiversity study is typically undertaken to inform design. Very site specific, so some projects could consider but not generally.			0			Not targeted due to costs but landscape architect may complete Green Star Ecological Value calculator to confirm if points possible based on proposed concept. Campus-wide credit	Low	
Sustainable Sites	24.0	Conditional Requirement	Mandatory for this Credit and Certification	Rewards projects that choose to develop sites that have limited ecological value, that reuse previously developed land, and that remediate contaminated land.	Site did not include old growth forest, prime agricultural land, wetland of high national importance or impact on matters of national significance	The EFSG require comprehensive due diligence studies are undertaken to inform site selection when a new school is developed. Ecologist report confirming no issues of concern present onsite. Or option for DA/SSD projects only - conditions showing site not subject to approval under the EPBC act	• DG03 - Site Selection	• Ecologist report • CV of Ecologist • Where applicable the project may use a statement acknowledging the length of time that the school has been in operation in lieu of providing the date of site purchase or option contract (previous condition of the site) and evidence of the site that existed at this time. (Approved in GBCA Request R-14474)	-	Y		Mandatory "Conditional Requirement" for all Green Star projects. Ecologist to confirm compliance with this credit. Campus-wide credit	High	
	24.1	Reuse of Land	1		Requires that 75% of the site was previously developed land at the date of site purchase	Most of SINSW projects are refurbishments of existing schools i.e. previously developed land. SINSW preferred approach is to avoid the need for new development	• DG03 - Site Selection	• Service Need Report • Business Case Report • Aerial photographs showing areas of previously developed land	1	1		Architect to confirm if at least 75% of new buildings are on "previously developed land". "Previously developed land" includes land this was occupied by a permanent structure, associated curtilage, road, car park or other hardstand. Campus-wide credit	High	
	24.2	Contamination and Hazardous Materials	1		Environmental site assessment concludes site is contaminated and is to be remediated prior to development	The EFSG require investigation of presence of contamination and hazardous materials and appropriate remediation measures.	• DG48 Hazardous materials	• Hazardous materials surveys • Decontamination reports and clearance certificates	1		0	This Credit is only applicable if there is substantial recommendations for containment and/or removal made in the site contamination report. Architect to confirm. Campus-wide credit **[15/03/2023]** Point not targeted	High	
Heat Island Effect	25.0	Heat Island Effect Reduction	1	Recognises projects that reduce the contribution of the project site to the 'heat island effect'.	75% of the total project site area comprises of elements to reduce heat island effect - vegetation, light colour roof, shading	The EFSG contain multiple provisions to this end: - Recommend use of lightly coloured roofs. - Minimum open space provision typically include landscaped areas - Tree preservation - PV installation (absorb heat)	• DG 27 - Roofing • DG 66 - PV solar generator • DG 90 - Landscape design	• Site drawing • Roofing and hardscape materials data sheets showing SRI for products	1	1		Architect to ensure compliance with this credit. Campus-wide credit **[29/05/23]:** Roof Colour Requirements Provided to DJRD	Med	
Emissions			**5**						**4**	**4**	**0**			
Stormwater	26.1	Stormwater Peak Discharge	1	Rewards projects that minimise peak storm water outflows from the site and reduce pollutants entering the public sewer infrastructure or other water bodies.	Post-development peak average recurrence interval (ARI) event discharge from site does not exceed pre-development	EFSGs require stormwater system to be integrated with relevant authority requirements, especially the local council and water authority.	• DG 2.4.3 - Stormwater Management • DG95 Stormwater	• Civil/Hydraulics drawings and specifications • Modelling/calculations report	1	1		Civil consultant to ensure compliance with this credit. Campus-wide credit	Med	**[05/10/2022] Enstruct:** Credit Achievable
	26.2	Stormwater Pollution Targets	1		Additional point awarded for stormwater site discharge to meet GBCA pollution reduction targets	EFSGs require stormwater treatment to minimise the transportation of toxicants to waterways and other offsite environments, and maintain the existing hydrological regimes. Local gov't may provide pre-determined infrastructure solutions that are 'deemed to comply' with the aim of this credit.		• Performance certifications for stormwater treatment devices	1	1		Civil consultant to ensure compliance with this credit. Campus-wide credit	Med	**[05/10/2022] Enstruct:** Credit Achievable **[03/04/2023] Enstruct:** Credit targeted
Light Pollution	27.0	Light Pollution to Neighbouring Bodies	Mandatory for this Credit	Rewards projects that minimise light pollution.	Requires that external luminaires meet Australian Standard to avoid light pollution to neighbouring development	EFSGs require external lights to be designed to prevent glare to nearby residents	• DG 63.08.01 - External Access Lighting	• As built drawings • Luminaire schedule • Calculation Plots	-	Y		Electrical consultant to ensure compliance with this credit. Campus-wide credit	High	**[29/06/2022] JHA-Elec:** Achievable with no cost implication
	27.1	Light Pollution to Night Sky	1		Requires that external luminaires do not emit light pollution to the night sky above a given benchmark	Not an EFSG requirement, however external lighting is minimal and luminaires typically meet the benchmark required.			1	1		Electrical consultant to ensure compliance with this credit. Campus-wide credit	Med	**[29/06/2022] JHA-Elec:** Achievable with no cost implication
Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	Minimise the impacts associated with harmful microbes in building cooling systems.	• Building naturally ventilated, or • Has waterless heat rejection system, or • Has water-based heat rejection systems that includes measures for Legionella control and Risk Management	Typically waterless air conditioning systems are installed.	• DG 51.09 - Microbial Control	• Mechanical system specifications	1	1		Mechanical consultant to confirm compliance with this credit.	High	**[01/07/2022] JHA-Mech :** No water cooled system proposed. No concerns.
Refrigerant Impacts	29.0	Refrigerant Impacts	1	Encourages practices that minimise the environmental impacts of refrigeration and air conditioning equipment.	Requires use of refrigerants with low ozone depletion potential	Not required in EFSG. This is a procurement decision that varies across projects.			-			Typically with the use of VRF system this is very challenging for schools.	Low	
Innovation			**17**						**10**	**10**	**0**			
30A Innovative Technology or Process	30A	Individual Thermal Comfort Control	1	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world	One (1) point is available for providing individual comfort control in all primary spaces. has achieved either the first or second 'Thermal Comfort' point, is mechanically ventilated and provides individual comfort control for temperature	Not currently supported by EFSG to provide individual comfort control to all students in all primary spaces			0				Low	
	30A	On-site Renewable Energy	2		Up to two (2) points may be awarded for installing on-site renewable energy sources. Partial points available - 1 point is 15% and 2 is 30%	EFSG requires all new buildings to have on-site solar	• DG66 - Photovoltaic Solar Power Generator Guidelines • SG933 - Schedule of Photovoltaic Solar Power Generator	• Electrical specifications • As built drawings • Product data sheets	1	2		Refer Calculation Guide, maximum 2 points available for 30% renewable Energy Contribution PV system will be documented to EFSG requirement	High	
	30A	Principal's Dashboard	1		Projects within the Schools Infrastructure NSW v1.3 Umbrella (GS-6039DA) may target one (1) point under credit criterion 30A Innovative Technology or Process for the Principal's Dashboard initiative.					0				**Not targeted.**
	30A	Heat Rejection Systems in Equipment Requiring Process Cooling	1		One (1) point is available where potable water use from heat rejection in process cooling is reduced	Water based HVAC systems not currently supported by EFSG due to risk of legionnaires			0				Low	
	30A	Microbial Control in Warm Water Systems	1		One (1) point is available warm water systems have been designed to manage the risk of microbial control.	Water based HVAC systems not currently supported by EFSG due to risk of legionnaires			0				Low	
	30A	Passive Water Treatment	1		Projects that use of passive water treatment systems (such as vegetation to treat water passively) to achieve at least one point in the potable water calculator.	This would require approval by DATS on a project specific basis. Ongoing site maintenance issues.			0				Low	
30B Market Transformation	30B	DfMA	**1**	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world	Requires DfMA objectives to be achieved on the project, with the benefits of this approach presented through the SI NSW DfMA discussion paper, analysing the lifecycle impacts, greenhouse gas emissions and energy analysis of prefabricated reusable building modules.	**GBCA Response R-14427** has approved projects delivered by Schools Infrastructure NSW to target one (1) point under 30B Market Transformation in Green Star - Design & As Built for seeking to integrate sustainability in the approach 'Design for Manufacture and Assembly' (DfMA).	DFMA Guideline for Schools	• A short narrative outlining the purpose of the DfMA analysis • DfMA Guideline document outlining how sustainability principles can be embedded throughout prefabricated building processes/ component-based construction. • Evidence outlining how DfMA has been used on the project • Evidence outlining how the sustainability advice in the Guideline was integrated into the construction of component-based structures; addressing a minimum of 3 items from the guidelines for each project (items may be the same on multiple projects)	1	0		Under SINSW Umbrella may target 1 points according to R-14427	High	
	30B	Passive Design	**1**		Projects that achieve more than 15 points through passive design or without energy generation or the purchase of offsets or Green Power in the 'Greenhouse Gas Emissions' credit can claim an Innovation point	Not currently supported by WOG mandatory electricity contract which includes 6% Greenpower			0				Low	
	30B	Soft Landings	**1**		The building is designed, built, commissioned, and tuned by adopting a 'Soft Landings' approach.	Soft landings approach is not currently supported by SINSW commissioning and handover procedures.			0				Low	
	30B	Sustainable Sourcing of Concrete Aggregates	**1**		Project teams who demonstrate the use of concrete aggregates that have chain of custody, or come from a responsible source can claim an Innovation Category point.	Not currently supported by EFSG or GC21 contract			0				Low	
	30C	Commissioning - Supplementary or Tenancy Fit out Systems Review	**1**		One (1) additional point may be awarded where project teams and building owners carry out a comprehensive services and maintainability review of supplementary or tenancy fit out systems, in addition to all nominated base building systems as outlined in the credit.	Unlikely to get full points in commissioning. Unlikely to be relevant to new school buildings			0				Low	
	30C	Commissioning - Building Air Permeability Rates	**1**		Up to two (2) additional points may be awarded where projects can demonstrate achieving air permeability rates from the 'normal' column (1 point) or 'best practice' column (2 points) as stated in Table 2.2, or where projects can demonstrate they have met the requirements of JV4 Section J NCC 2019	Air tightness testing is not currently a standard process on projects			0				Low	

30C Improving on GS Benchmarks	30C	Indoor Pollutants - Ultra Low VOC paints	**1**	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	One (1) additional point may be awarded where over 50% of paints (by volume) specified in the building have a maximum TVOC content of 5g/L. This must be verified by one of the approved paint test methods	EFSG specification currently require mainly Low, not Ultra Low, VOC paints.			0	1		**[15/03/2023]** Point to be targeted	Med	
	30C	GHG - Reference Building Pathway	**1**		On-site energy renewable systems produce 5% more energy than what is required by the building. Energy must be exported or stored on site.	Due to operational profile of schools, solar pv systems tend to export up to 30% of generated electricity	● DG66 - Photovoltaic Solar Power Generator Guidelines ● SG933 - Schedule of Photovoltaic Solar Power Generator		1	0			High	
	30C	Transport - No new Carparks on site	**1**		One (1) point will be awarded where no new car parking is provided on-site. This applies regardless of who operates the car parking, even if it's operated by an external party.	As projects generally achieve 10 points in Transport, this can be targeted on existing school sites with new buildings	● T-Reign Practice Note 16: SINSW Transport Planning Document pack		1	1		Project specific - generally for projects on existing schools with new buildings. **[17/03/2023]:** Credit to targeted	Med	**[03/07/2022] DJRD :** Both projects have existing carparks which will be extended to meet demands of larger schools
	30C	Water - Discharge to Sewer	**1**		One (1) point can be claimed for a 90% or greater reduction in flow to sewer as determined by the Potable Water Calculator	Projects generally won't achieve the 90% or greater reduction			0				Low	
	30C	LCA	**1**		One (1) point is awarded where the cumulative impact reduction as defined within the credit is increased by 20% to a total of 150%. An additional 20% improvement is rewarded with a second point.	Projects generally will not complete an LCA			0				Low	
	30C	Sustainable Products	**2**		One (1) point is awarded where the percentage of compliant products is increased by 3% to 12%. A further 3% improvement is rewarded with a second point.	Projects generally will not be able to achieve.			0				Low	
	30C	Reduction of construction and demolition waste	**1**		One (1) point is available where the construction and demolition waste going to landfill meets a fixed benchmark of 5kg of waste per square meter of gross floor area (GFA).	Projects generally will not be able to achieve.			0				Low	
	30C	Stormwater Pollution Targets	**2**		Up to two (2) additional points may be awarded where projects can demonstrate achieving Pollution Reduction Targets from column B (1 point) or C (2 points) as stated in Table 26.1.	Projects generally will not be able to achieve.			0	1			Low	**[03/04/23] Enstruct:** Able to achieve Column B Targets
30D Innovation Challenge	30D	Carbon Neutral Construction Services	**1**	To reward projects which offset carbon emissions that arise during the construction of a project within the head contractor's operational control	Requires the head contractor delivering the project to have achieved Climate Active Carbon Neutral Certification for its construction services;	Not currently supported by GC21 Contract			0				Low	
	30D	Carbon Positive New Buildings	**1**	To recognise assets that are on a leadership path to a carbon positive built environment.	The building owner commits to annually achieve whole building Carbon Neutral Building Certification for 6 consecutive years after initial certification	Not currently supported by SINSW			0				Low	
	30D	Community Benefits	1	Encourages investment in infrastructure for use by the broader community, such as the incorporation of spaces that are publicly accessible.	Requires a needs analysis of the surrounding community and a strategy for how the project will provide social/community benefits and consult with the broader community on the proposed plan.	The GBCA response R-14478 has accepted the Department of Education's policy 'Community Use of School Facilities' and 'Share Our Spaces' program guide in lieu of the Needs Analysis Report.	● Community Use of School Facilities Policy ● Share Our Spaces program ● DC16.08 Community Use Facilities	● Community Use of School Facilities ● Share Our Spaces' program ● Confirmation of spaces accessible for community uses	1	0		R-14478	High	
	30D	Culture Heritage and Identity	1	Encourages the use, interpretation and celebration of buildings with cultural heritage.	Requires the building to be recognised as a place of heritage value, as defined in the Burra Charter or through a heritage listing within a state or local register and celebrates and makes visible heritage elements.	Will require consideration of what buildings onsite are within boundary of Green Star registration, as generally existing heritage buildings are out of scope.			1			Project specific and can have implications for boundary of Green Star registration	Med	
	30D	Financial Transparency	1	Increase the amount of information available to industry on the costs and benefits of sustainable building	Requires submission of the 'Financial Transparency Disclosure Template' that comprehensively itemises design, construction, documentation and project costs related to Green Star submission	Not currently supported by SINSW. Will require approval by executive.							Med	
	30D	High Performance Site Office	1	Recognises the sustainability performance of site offices, thus increasing health and productivity outcomes of site works.	Requires the Contractor to complete the 'High Performance Site Office Checklist' demonstrating that site sheds comply with at least 75% of the requirements in the Checklist	Not currently supported by GC21 Contract but may be implemented by Construction Contractor anyway.							Med	
	30D	Incorporation of Indigenous Design	1	Encourages the incorporation of Aboriginal and Torres Strait Islander participation in the design development of the projects and visibility throughout the project's life cycle using Indigenous Design and Planning principles	Project teams must demonstrate that the Australian Indigenous Design Charter guiding principles are incorporated in the design of the building.		GAO Designing with Country	Connecting to country engagement strategy Meeting minutes Design outcomes	1	1			High	**[29/05/2023] DJRD:** AH provided information regarding indigenous design. To be collated.
	30D	Integrating Healthy Environments	1	Supports high-performance, cost-effective and health-promoting project outcomes through an early analysis of the interrelationships among systems.	Requires an analysis of community health needs and to address those needs through implementation of adequate strategies	The GBCA have commended the Department of Education for encouraging healthy dietary options in an effort to help reduce childhood obesity through the healthy canteen policy which has been approved for this innovation challenge. Refer **GBCA Response R-14476** - The GBCA have approved school projects to provide the Healthy Canteen Policy research report in lieu of a community analysis report.	● Healthy Canteen Strategy	● Healthy Canteen Strategy • Research report behind Healthy Canteen Policy. • A Letter of Commitment that the program will be implemented by the school. • Evidence demonstrating that this policy has/ will be implemented on the school under assessment.	1	0		R-14476	High	
	30D	Local Procurement	1	Encourages projects to use materials, products or services produced or generated within Australia.	**Local Products and Materials** 1 point is awarded where the project team demonstrates that a percentage of the products and materials used in the project were produced or manufactured in Australia **Local Services and Skilled Labour** 1 point is awarded where the project team demonstrates that a percentage of the services and skilled labour employed by the project come from the local area surrounding the site	Not currently supported by GC21							Low	
	30D	Marketing Excellence	1	To engage, educate and sell the benefits of sustainable building practices and Green Star to building occupants and the wider community through marketing information developed on the basis of comprehensive market research.	•Develop methodology and perform market research on the investment drivers of end-users of the building, • Develop a marketing strategy that addresses these drivers in relation to the sustainability measures implemented. • Implement this marketing strategy and provide developed samples at the time of the project's Green Star submission. • Provide information on the benefits of sustainability in a public and prominent way within your building • Provide the information required to create a case study at the time of the project's Green Star submission. This includes:	Not templates or processes currently developed by SINSW							Med	
	30D	Occupant Engagement	1	To increase the availability of information on the benefits and outcomes of sustainable design practices and sustainable operation practices across the industry	1 point is awarded where the Applicant carriers out a pre and post occupancy survey	Not currently supported by SINSW project processes							Med	
	30D	Powered by Renewables	1	To recognise buildings that are designed to operate efficiently, eliminate fossil fuel use and operate on net 100% renewable energy	Publicly commit that 100% renewable electricity to be procured during operation. Commit to maintaining a Green Star – Performance rating for two certification cycles or 6 years Achieves 15% greenhouse gas emissions improvement on the relevant Green Star rating requirements through energy efficiency or on-site renewables in 'Greenhouse Gas Emissions	Not currently supported by WOG Mandatory electricity contract which limits Greenpower to 6%							Low	

	30D	RAP	1	Encourages organisations to take formalised steps to provide opportunities for Aboriginal and Torres Strait Islander peoples.	A reconciliation action plan endorsed by Reconciliation Australia is required	The Department of Education has a RAP in place which the GBCA has confirmed can be used to target the innovation challenge through the frequently asked question **FAQ F-00101** The Individual project must demonstrate a relationship to, and a role in delivering, the action items within the organisational RAP. The actions within the DOE Rap cover four key areas: Relationships, Respect , Opportunities and Governance & Tracking Progress Individual Schools may seek to integrate a number of RAP targets within the design & construction of the project: ● Build internal and external relationships ● Investigate Aboriginal and Torres Strait Islander cultural learning and development ● Raise internal understanding of Aboriginal and Torres Strait Islander cultural protocols ● Investigate Aboriginal and Torres Strait Islander employment ● Investigate Aboriginal and Torres Strait Islander supplier diversity	●DOE Reconciliation Action Plan - Reflect ● GA NSW Designing with Country ● NSW Government Aboriginal Participation in Construction (APIC) Policy ● NSW Government Aboriginal Procurement Policy 2021	● Aboriginal community engagement or measures implemented in project ● Design Reports which detail how design principles celebrate indigenous cultural heritage ● Targets or strategies regarding engagement of Aboriginal and Torres Straight Islander individuals or organisations within the project team	1	1		The DOE Reflect RAP was dated January 2019 – January 2020. The RAP currently in the process of being reviewed and updated to the next iteration. F-00101	Med	
	30D	Universal Design	1	Encourages projects to provide safe, equitable and dignified access for persons with disabilities.	Require to develop and implement an accessibility plan based on a needs analysis	The EFSG contain extensive provisions to ensure universal design. Refer GBCA Response R-14538 The GBCA have accepted the EFSG provisions for universal design in lieu of needs analysis.	● DG19 Access for People With Disabilities ● DG 65.14 - Hearing Augmentation System	● As built drawings ● DDA compliance reports	1	1		R-14538	High	
	30D	Responsible Carbon Impacts	1	To recognise assets that reduce and offset their embodied carbon and move the supply chain to carbon neutrality	Achieve at least 3 points in LCA 19A and purchase Climate Active Carbon Neutral eligible offsets equal to the remaining embodied carbon	Not currently supported by SINSW							Low	
	30D	Social Return on Investment	1	To recognise holistic methods to assess return on investment on the productivity, health and other social benefits provided by a project	•Complete an analysis of the direct costs and benefits provided by elements of the project above and beyond standard practice. This analysis can include those costs and benefits resulting from the sustainability initiatives implemented in targeting credits for your project's Green Star rating (excluding Innovation credits); and • Complete an analysis of the indirect costs and benefits provided by the project in the areas of productivity, health, crime reduction, employment, and skills development or similar.	Likely that Business Cases would achieve this. A credit interpretation request to be submitted to confirm business case structure complies.							Med	
	30E	Amenity Space [GSI]	1	Recognises the provision of high quality amenities for fit out occupants' use.	Require provision of high quality amenity space intended for use by staff or regular occupants suitable for their enjoyment. The size and qualities of the space are determined via a needs analysis.	Compliance likely to be demonstrated using staff room amenities. TQ to be submitted to GBCA to clarify evidence requirements.			1		0	TQ yet to be submitted by SINSW Sustainability confirming requirements **[15/03/2023]** Point to be not targeted	High	
	30E	Digital Infrastructure [GSC]	1	Recognises projects that use digital infrastructure to create greater efficiencies in the connection of individuals with other people, goods, services, and information.	Require FTTP and Fixed wireless connectivity to be provided	SINSW projects go above and beyond this credit requirements. **GBCA FAQ F-00132** requires project to show significant community impact. TQ to be submitted to GBCA to clarify evidence requirements.	● DG 64 Communications	● Confirmation by head contractor	1		0	TQ yet to be submitted by SINSW Sustainability confirming requirements **[15/03/2023]** Point to be not targeted	High	
	30E	Green Cleaning [GSP]	1	Rewards use of green cleaning services that prevent the use of contaminants that impact on indoor environment quality, occupant health and the natural environment.	The credit requires a green cleaning policy is developed and implemented	Whole of Government Facilities Management Services (Asset Maintenance and Cleaning) contract contains Green Cleaning provisions that have been accepted by the GBCA for this credit.	● General Cleaning Specifications (Part F2) ● WEBClean School User Guide	● Confirmation by school principal or facilities maintenance contract manager that school will be using contract.	1	1		TQ yet to be submitted by SINSW Sustainability confirming requirements **[15/03/2023]** Point to be targeted	High	
	30E	30E Site Planning and Layout [GSC 2.1]	-	Recognises projects that undertake a design review process designed to facilitate sustainable urbanism.	Requires independent design review is undertaken against urban design themes to inform project design	Design review is undertaken on all SINSW projects by an independent technical stakeholder group and the EFSG and Design Advisory teams. Additional independent design reviews may also be undertaken by the State Design Review Panel managed by the Office of the Government Architect NSW. In all cases, the design review is fully independent from the design team	● Project Governance Framework	● Expert review group and technical stakeholder group (TSG) meeting minutes ● TSG sign off certificates ● Design Advisory Reports ● Minutes from GANSW meetings	-			30E: Usually GBCA will limit the points that can be claimed through the 30E pathway (e.g. credit may be worth 2 points in communities but only 1 point in Innovation for DAB)	High	
	30E	Urban Design [GSC 2.1]	1						1			TQ yet to be submitted by SINSW Sustainability confirming requirements	High	
30 E Global Sustainability	30E	Stakeholder Engagement Strategy [GSC 3.1] Community engagement	1	Recognises projects that develop and implement a comprehensive, project specific stakeholder engagement strategy early in the planning process.	The project has a Stakeholder Engagement Strategy prepared in accordance with specified requirements.	Extensive stakeholder engagement is undertaken for all capital projects via project reference groups (PRG), project control groups (PCG) and broader community consultation. Stakeholders needs and comments are assessed and responded.	● Project Governance Framework	● Service need report ● Education rationale ● PRG meeting minutes ● Business case report ● Community consultation strategy and materials ● Responses to community feedback	1		0	R-14544 **[15/03/2023]** Point to be not targeted	High	
	30E	Strategy Implementation [GSC 3.2]	1		The Stakeholder Engagement Strategy is being implemented and formal monitoring, evaluation and corrective action is being undertaken.				1			TQ yet to be submitted by SINSW Sustainability confirming requirements	High	
	30E	Healthy Places [GSC 9.2]	1	Recognises projects designed and built in line with holistic active and healthy living principles.	Requires project to be designed to achieve five key principles around walkability, active and public transport, wayfinding, good public space design and social interaction.	The education rationale process requires key principles are considered in new school development. The EFSG contains provisions for wayfinding, open play space and improved public spaces.	● DG 90.04 - School Landscape Design Principles ● Transport Practice Note ● DG 10.03 Open Play Space Requirements	● Education Rationale Report ● Traffic & Transport Report and Green Travel Plan ● Master Plan report ● Landscape drawings	1			TQ yet to be submitted by SINSW Sustainability confirming requirements	High	
	30E	Access to Fresh Food [GSC 14.1]	-	Recognises projects where occupants have access to fresh food within walking distance	Requires access to fresh food in projects	A canteen is always included in the project design to ensure students have access to healthy food. Larger canteens are provided in projects that include student accommodation	● PS 604 - Canteen Unit	● Architectural drawings	-			30E: Usually GBCA will limit the points that can be claimed through the 30E pathway (e.g. credit may be worth 2 points in communities but only 1 point in Innovation for DAB)	High	
	30E	Local Food Production [GSC 14.1]	1		Requires the project has a strategy to integrate productive landscape within the landscape objectives for the project site.	Typically, schools include food gardens to provide hands on education opportunities for students and for the local community.	● DG 02.06 - Ecological Conservation	● Landscape drawings	1			TQ yet to be submitted by SINSW Sustainability confirming requirements	High	
	30E	Visibility [GSC 15.0]	-	Recognises projects that take into consideration designing out crime principles.	Requires direct lines of sight to all public areas	The EFSG contain provisions to guarantee occupant safety and security. Safety in Design and Crime Prevention Through Environmental Design (CPTED) principles are to be implemented in project planning stage.	● DG14 - Safety - Accident Avoidance ● DG65.08 - Electronic Surveillance ● DG65.10 - CCTV Installations ● DG31.03 - Safety Glass	● CPTED assessment ● Safety by design report ● CCTV drawings	-			30E: Usually GBCA will limit the points that can be claimed through the 30E pathway (e.g. credit may be worth 2 points in communities but only 1 point in Innovation for DAB)	High	
	30E	Design for Safety [GSC 15.1]	1		Requires incorporation of CPTED principles				1	1		TQ yet to be submitted by SINSW Sustainability confirming requirements	High	

APPENDIX C – SCHEMATIC DESIGN ESD REVIEW

APPENDIX D – CLIMATE CHANGE RISK AND ADAPTATION ASSESSMENT

Climate Change & Risk Adaptation Assessment

SINSW Cluster C – Rouse Hill High School

ESD SERVICES

JHA

CONSULTING ENGINEERS

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

DOCUMENT CONTROL SHEET

Project Number	220210
Project Name	SINSW Cluster C – Rouse Hill High School
Report Phase	Phase 3
Description	Climate Change Risk & Adaptation Assessment
Key Contact	George Economy

Prepared By

Company	JHA
Address	Level 20, 2 Market Street, Sydney NSW 2000
Phone	61-2-9437 1000
Email	Gary.Tang@jhaengineers.com.au
Website	www.jhaservices.com
Author	Gary Tang, Laura Golembowski
Checked	Gary Tang
Authorised	Lawrence Yu

Revision History

Issued To	Revision and Date								
SINSW	REV	Draft	REV	C					
	DATE	10/10/2022	DATE	20/01/2025					
	REV	A	REV	D					
	DATE	17/10/2022	DATE	23/01/2025					
	REV	B	REV	E					
	DATE	02/12/2022	DATE	12/02/2025					

CONTENTS

1 EXECUTIVE SUMMARY

JHA Consulting Engineers has been commissioned by School Infrastructure NSW (SINSW) to prepare a Climate Change Risk & Adaptation Assessment for the proposed upgrades to Rouse Hill High School.

The impacts of climate change were assessed across two time scales (2030 & 2070) and two Representative Concentration Pathways (RCP 4.5 & RCP 8.5). Climate Futures matrices were used to determine the key climate projections based on multiple climate variables for this risk assessment. The key climate projections were used to inform the climate risk assessment.

The risk priority levels of the climate risks identified pre- and post-adaptation are summarised below:

Risk rating	2030 Pre-adaptation	2070 Pre-adaptation	2030 Post-adaptation	2070 Post-adaptation
Low	1	0	4	2
Medium	4	3	1	3
High	0	2	0	0
Extreme	0	0	0	0

The results of the climate risk assessment identified two high risks items pre-adaptation. These high risks were mitigated to medium risks by the proposed adaptation actions. The responses to high risks are summarised as follows:

1. Hotter and dryer conditions causing an increase in the frequency and/or severity of bushfire events directly damaging the building. This risk is mitigated by ensuring non-combustible building elements are used in the fabric of the building and by implementing good management practice to remove potential fuel source around the building once the building is in operation.
2. Higher maximum temperatures causing an increase in frequency and/or duration of extreme heat-days and heatwaves resulting in insufficient capacity of the HVAC system to maintain thermal comfort. This risk is mitigated by incorporate passive thermal design principles in the design and construction of the building such as appropriate levels of thermal insulation.

In summary all risk items identified as 'high' or 'extreme' are addressed by specific design responses in addition to at least two risks items identified in the risk assessment being addressed by specific design responses.

2 INTRODUCTION

This Climate Change Risk & Adaptation Assessment has been prepared to accompany a Review of Environmental Factors (REF) for the Department of Education (DoE) for upgrades to Rouse Hill High School (the activity) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP TI).

This document has been prepared in accordance with the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure.

This report examines and takes into account the relevant environmental factors in the Guidelines and *Environmental Planning and Assessment Regulations 2021* under Section 170, Section 171 and Section 171A of the EP&A Regulation as outlined in Table 1.

Table 1 – Summary of Relevant Section of the Part 5 Guidelines and EP&A Regulation

Regulation / Guideline Section	Requirement	Response	Report Section (within Climate Change Risk & Adaptation Assessment)
Guidelines for Division 5.1 assessments	Considering environmental factors: h) Any long-term effects on the environment Climate change j) Any risk to the safety of the environment Public health, bushfire, sea level rise, flood, storm surge, wind speeds, extreme heat, urban heat and climate change adaptation	The project delivers a Climate Change Risk & Adaptation Assessment to assess the climate change scenarios and impacts, as well as identify the potential risks for the project and people. This information helps to address the risks and prepare adaptation measures.	See Section 2.3, 3-6, and Appendix

2.1 PROPOSED ACTIVITY DESCRIPTION

The proposed activity for the alterations and additions to Rouse Hill High School including:

- Demolition of existing footpaths, stairs, and the relocation of an existing seating shelters towards the west of Block F;
- Tree removal;
- Construction of a two (2) storey classroom building (known as Building L), comprising eleven (11) general learning spaces (GLS) and 2 Science Labs;
- Construction of new footpaths and a new covered bicycle parking space;
- New emergency vehicle access; and
- Landscaping, including the planting of trees.

This report covers the requirement of EFSG (applicable to the whole project) and the design requirements to achieve a 5 Star Green Star Design & As-Built certification of the proposed new Building L.

2.2 ACTIVITY SITE

The project site is located on Withers Road in Rouse Hill and is legally described as Lot 105 in Deposited Plan (DP) 1108407. Rouse Hill High School is located on the western side of Withers Road.

Figure 1 provides an aerial photograph of the site.

Figure 1: Aerial Photograph

2.3 PURPOSE OF THE ASSESSMENT

This Climate Change Risk & Adaptation Assessment will form part of the Sustainable Development Plan submission for the project. In accordance with EFSG DG02.08 and Green Star Design & As Built v1.3 requirements the purpose of this assessment is to provide:

- Details of stakeholder consultation that was undertaken during plan preparation, incorporating their responses (See Section 2.1)
- Summary of the project's characteristics (site, location, climatic characteristics) (See Section 3)
- Assessment of climate change scenarios and impacts on the project using two time scale relevant to the project anticipated lifespan (See Section 4)
- Summary of potential direct and indirect climate change impacts (environmental, social and economic) (See Section 5)
- Identification of the potential risks for the project and people based on recognised standard (See Section 5)
- A list of actions and responsibilities for 'high' and 'extreme' risks identified (See Section 5)

2.4 STAKEHOLDERS CONSULTED

Stakeholders engaged in the development as a part of the CAP process are listed below.

Stakeholder	Discipline
Andreas Brohl, Pete Krause, Mathew Wood, Zaid Gourbandi	SINSW | Project Director
Penny Blunden, George Economy	Savills | Project Management
Tasmin Dunn, Alisa (Zhi-Qing) Huang, Dodie McMenamin	DJRD | Architect
Dominic Wong	JHA | Mechanical Engineer
Kishan Chand	JHA | Electrical Engineer
George Koutoulas	JHA | Hydraulic Engineer

Chris Hadjiyiannis	JHA | Fire Engineer
Jorge Reverter	JHA | Acoustic Engineer
Gary Tang	JHA | ESD Engineer
Phillip Lambley, Mia Veitch	Enstruct | Civil Engineer
Alan Moore	Enstruct | Structural Engineer

2.5 REFERENCE DOCUMENTS AND STANDARDS

This Climate Change Risk & Adaptation Assessment will assess potential risks and propose mitigation strategies as necessary in accordance with the following documents and standards:

- Green Star Design and As-Built v1.3 Submission Guidelines
- ISO 31000-2009 – Risk Management – Principles and Guidance (adopted in Australia and New Zealand as AS/NZS ISO 31000:2009)
- The AGO's Climate Change Risks and Impacts: A Guide for Government and Business

3 PROJECT'S CLIMATE CHARACTERISTICS

Rouse Hill is located in NCC Climate Zone 6, which is described as having hot to very hot summer with moderate humidity and mild to cold winter with low humidity. The main aims in this zone are to reduce the need for cooling in summer and heating in winter. This zone offers good cost-effective opportunities to achieve energy-efficient outcomes.

3.1 BASELINE CLIMATIC CONDITIONS

The baseline climatic conditions for Rouse Hill is taken from the closest weather station data available from the BOM. The closest weather station is Seven Hills (Collins Street), which is approx. 9.8 km away from Rouse Hill.

Monthly Climate Statistics for 'Seven Hills (Collins Street)"

- **Site name:** Seven Hills (Collins Street)
- **Site number:** 067026
- **Latitude:** 33.77 °S **Longitude:** 150.93 °E
- **Elevation:** 50 m

Statistic Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	An.
Maximum temperature													
Mean maximum temperature (Degrees C)	28.3	27.7	27.0	24.1	20.0	17.4	17.4	18.6	21.4	23.8	26.3	28.4	23.4
Highest temperature (Degrees C)	41.4	41.1	40.0	33.6	28.3	24.0	25.8	27.8	35.0	36.6	39.0	41.7	41.7
Minimum temperature													
Mean minimum temperature (Degrees C)	16.7	17.0	15.7	12.3	8.3	6.3	4.5	5.9	7.9	11.0	12.9	15.3	11.1
Lowest temperature (°C)	8.9	8.3	5.3	4.4	0.8	-1.1	-3.9	-0.8	0.3	3.3	6.1	8.5	-3.9
Rainfall													
Mean rainfall (mm)	102.6	117.9	117.7	73.9	65.4	78.9	47.3	54.0	47.3	70.1	81.5	73.0	913.8
Highest rainfall (mm)	440.1	474.2	567.2	455.6	395.4	489.2	323.2	394.2	223.4	211.8	364.6	254.7	1711.2
Solar Exposure													
Mean Solar Exposure (MJ/m^2)	22.1	19.0	16.2	13.6	10.5	8.8	9.9	13.1	16.7	19.5	21.2	22.6	22.1
Highest Solar Exposure (MJ/m^2)	26.9	22.8	20.6	15.9	12.1	10.3	11.5	15.1	19.2	23.0	27.3	25.8	26.9

3.2 PAST EXTREME EVENTS

Extreme events that have impacted a site in the past are indicative of possible extreme events that will impact the site in the future. The identification of past extreme events will help highlight the climate risks that should be the focuses of this risk assessment.

Past climatic events that have impacted and potential hazards that may affect the site are summarised below:

- Heat waves – A heatwave is defined as three or more days of high maximum and minimum temperatures that are unusual for that location. Over the period 1911–2013, heatwaves in parts of NSW have become longer, hotter and occur more often. Hotter and more frequent heatwaves will contribute to the risk of bushfires. Infants and young children are considered one of the groups most at risks to impact of heat related illness. [Source: AdaptNSW Heatwaves Climate Change Impact Snapshot]

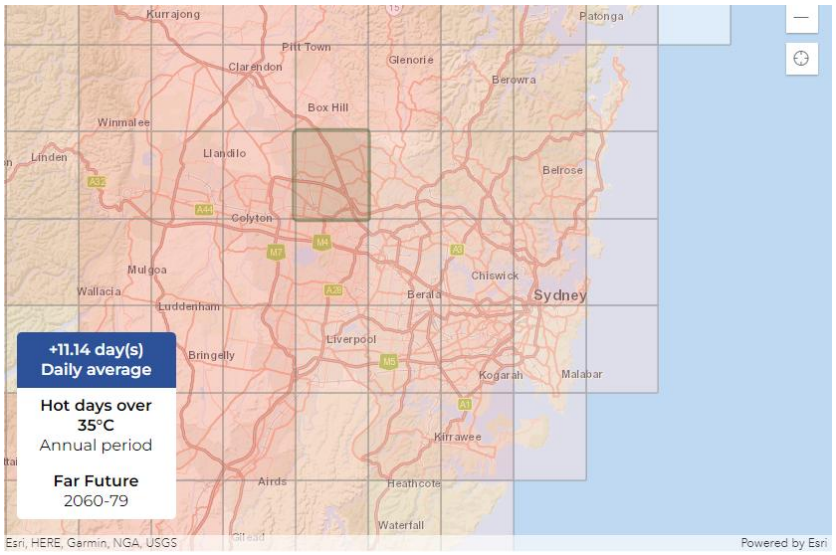


Figure 2: Projected increase of hot days over 35C in 2060-79

- Bushfire – The parcel of land selected is within a designated bushfire prone area. [Source: NSW RFS Bushfire Prone Land 2017]. Its close proximity to Category 1 (Red = Highest Risk) means that the site is subject to be impacted by bushfires. The project should consider the future possibility of bushfires occurring within proximity to the site and their impacts, both direct and indirect.

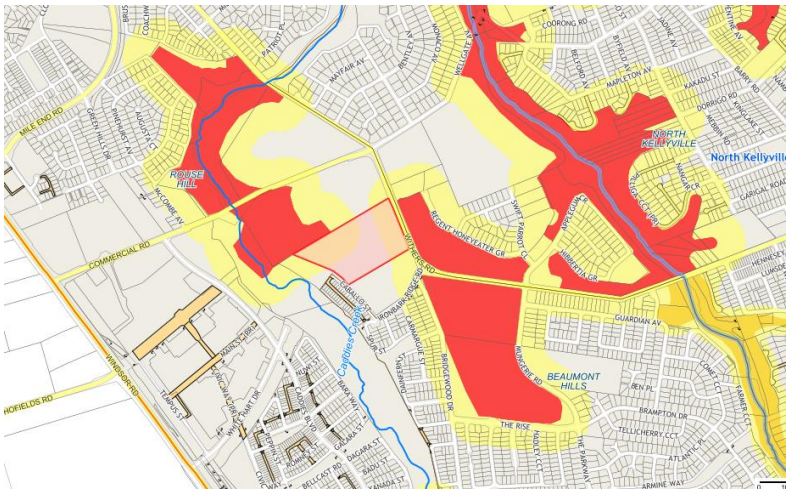


Figure 3: Figure 3: Bushfire Prone Map of Site

- Storms/Gustier Wind – Thunderstorms are the most common type of storms in New South Wales, causing more damage than any other short duration weather event. They can last from 10 minutes to several hours, with very strong winds, heavy rain and hail causing flash flooding, power outages and damage to property. Historically, this area has experienced hailstorm damage with hailstones the size of golf balls in 2017.

3.3 PROJECT SPECIFIC RISK STATEMENTS

Based on the project's baseline climatic characteristics and past extreme events, the following project specific climate risk statements are formulated:

1. Hotter and dryer conditions causing increase in the frequency and/or severity of bushfire and heatwave events.
2. Warmer temperatures and increased moisture in the atmosphere causing increase in severity of extreme storm/wind events (by providing more fuel to increase the wind speeds of storms).

4 CLIMATE CHANGE SCENARIOS AND IMPACTS

4.1 REGIONAL OVERVIEW

The subject site is located within the East Coast South sub-cluster.

Figure 4: East Coast South sub-cluster

The East Coast south sub-cluster comprises Natural Resource Management (NRM) regions in the central part of the eastern seaboard of Australia. The area encompasses important headwater catchments for a high proportion of Australia's population.

The sub-cluster area has a predominantly sub-tropical climate, with regional variations such as some temperate influences in the south.

Key projection messages for this sub-cluster:

- Average temperatures will continue to increase in all seasons (very high confidence).
- More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.
- Decreases in winter rainfall are projected with medium confidence. Other changes are possible but unclear.
- Increased intensity of extreme rainfall events is projected, with high confidence.
- Mean sea level will continue to rise and height of extreme sea-level events will also increase (very high confidence).
- A harsher fire-weather climate in the future (high confidence).
- On annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.

4.2 REPRESENTATIVE CONCENTRATION PATHWAY

In order to source relevant climate projection, appropriate Representative Concentration Pathway (RCPs) based on the latest Intergovernmental Panel on Climate Change (IPCC) report are chosen. The RCPs provide plausible climate futures that may eventuate over the coming years. There are four pathways: RCP8.5, RCP6, RCP4.5, RCP2.6, where the numbers of each RCP refer to the amount of radiative forcing produced by greenhouse gases in 2100.

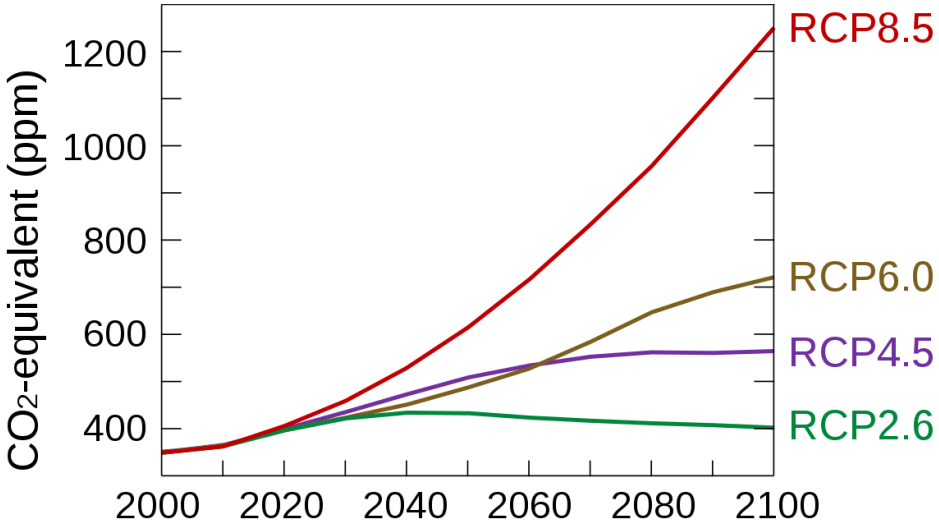


Figure 5: IPCC Representative Concentration Pathway

The RCP 8.5 scenario has been selected as one future climate projection for this assessment as it is the most conservative pathway and because current emissions are tracking close to RCP 8.5. RCP 8.5 reflects a future with less curbing of emissions and continued increase in fossil fuel use. It is the generally taken as the basis for worst-case climate change scenarios.

The RCP 4.5 is chosen to represent a stabilisation pathway in which lower emissions is achieved by application of some mitigation strategies and technologies. RCP 4.5 reflects a future where emissions peak around 2040, and the CO_2 concentration reaches 540 ppm by 2100.

4.3 PROJECTION TIME SCALE

The lifespan of the project components were considered to determine the appropriate projection time scale. Based on components design life of school building, the time series that is selected to understand the future climate impacts across the project's life are 2030 and 2070.

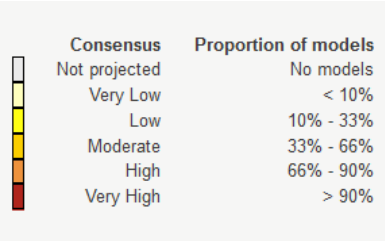
4.4 CLIMATE VARIABLES OF INTEREST

Based on the above, the climate variables of interest for this site are maximum daily temperature and rainfall (rainfall correlates to humidity).

Events	Variables	Key Cases
Bushfires	Average temperature and rainfall (annual)	"Best Case": Climate Future with the least increase in average temperature and the least decrease (or most increase) in rainfall (shorthand: "coolest and wettest") "Worst Case": Climate Future with the greatest increase in average temperature and the greatest decrease (or least increase) in rainfall (shorthand: "hottest and driest")
Heatwaves	Maximum daily temperature and humidity (Annua)	"Best Case": Climate Future with the least increase in maximum daily temperature and the least increase (or most decrease) in humidity (shorthand: "coolest and least humid") "Worst Case": Climate Future with the greatest increase in maximum daily temperature and the greatest increase (or least decrease) in humidity (shorthand: "hottest and most humid")
Storms	Rainfall and temperature (annual)	"Best Case": Climate Future with the least increase (or most decrease) in rainfall and the least increase in average temperature (shorthand: "driest and coolest") "Worst Case": Climate Future with the greatest increase (or least decrease) in rainfall and the greatest increase in average temperature (shorthand: "wettest and hottest")

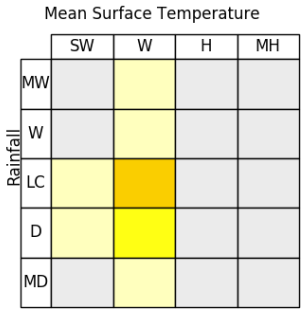
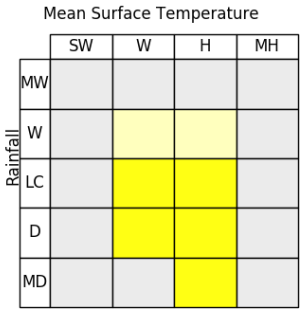
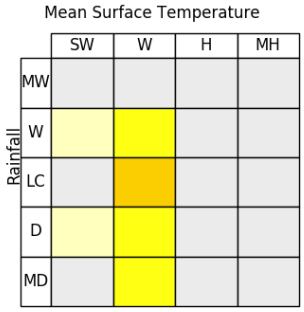
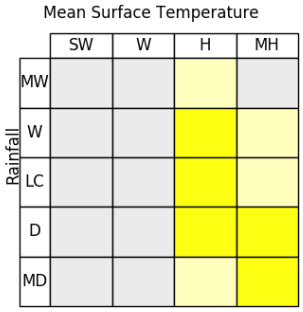
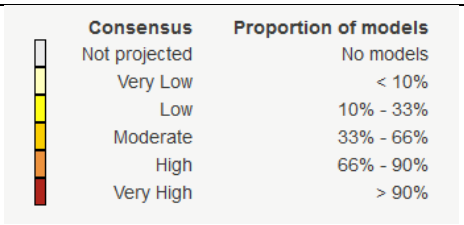
4.5 CLIMATE FUTURE PROJECTIONS

The series of climate futures matrices representing the combination of time periods and greenhouse gas scenarios and classified by the combined changes of the climate variables identified above are provided in table below. All climate future matrices are sourced from CSIRO and Bureau of Meteorology, Climate Change in Australia website - www.climatechangeinaustralia.gov.au, cited 15/09/2020.



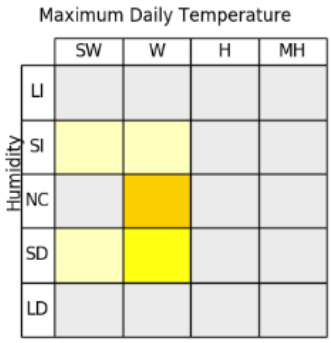
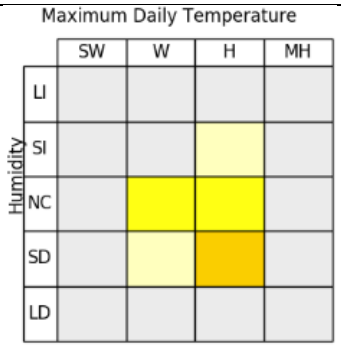
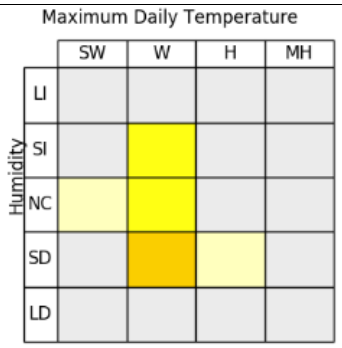
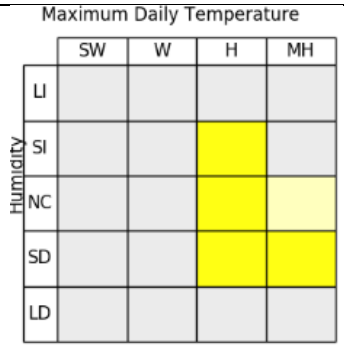
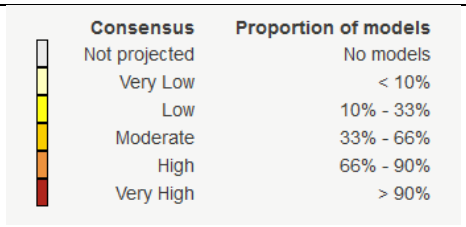
Colour legend of climate future projection consensus levels

4.5.1 ANNUAL AVERAGE TEMPERATURE AND RAINFALL MATRICES (BUSHFIRES)

East Coast (South) Climate Futures		Year	
		2030	2070
Emissions Scenarios	RCP 4.5		
	RCP 8.5		
Keys		Maximum Daily Temperature SW Slightly Warmer < 0.50 W Warmer 0.50 to 1.50 H Hotter 1.50 to 3.00 MH Much Hotter > 3.00 Rainfall MW Much Wetter > 15.00 W Wetter 5.00 to 15.00 LC Little Change -5.00 to 5.00 D Drier -15.00 to -5.00 MD Much Drier < -15.00	

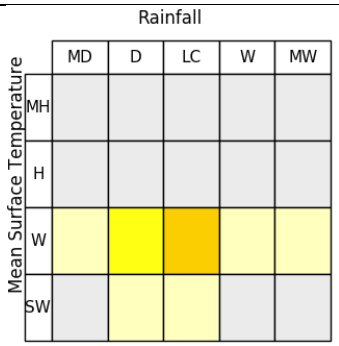
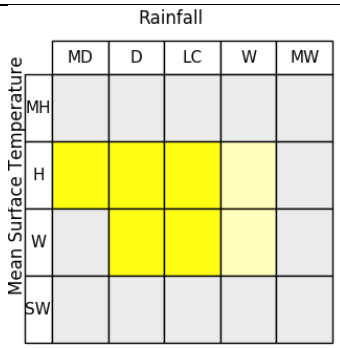
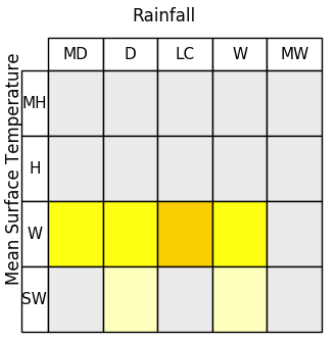
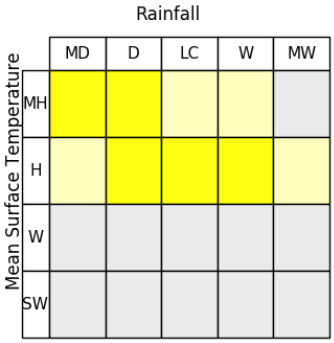
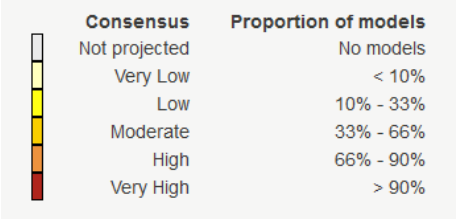
Case	2030 Climate Future		2070 Climate Future	
	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
"Best"	Slightly warmer and little change in rainfall (Consensus: Very low)	Slightly warmer and wetter (Consensus: Very low)	Warmer and wetter (Consensus: Very low)	Hotter and much wetter (Consensus: Very Low)
"Worst"	Warmer and much drier (Consensus: Very low)	Warmer and much drier (Consensus: Low)	Hotter and much drier (Consensus: Low)	Much hotter and much drier (Consensus: Very low)
"Maximum consensus"	Warmer and little change in rainfall (Consensus: Moderate)	Warmer and little change in rainfall (Consensus: Moderate)	Warmer to hotter and little change to drier (Consensus: Low)	Hotter to much hotter and drier to much drier (Consensus: Low)

4.5.2 SUMMER MAXIMUM DAILY TEMPERATURE AND HUMIDITY MATRICES (HEATWAVES)

East Coast (South) Climate Futures		Year	
		2030	2070
Emissions Scenarios	RCP 4.5		
	RCP 8.5		
Keys		**Maximum Daily Temperature** SW Slightly Warmer < 0.50 W Warmer 0.50 to 1.50 H Hotter 1.50 to 3.00 MH Much Hotter > 3.00 **Humidity** LI Large Increase > 10.00 SI Small Increase 1.00 to 10.00 NC No Change -1.00 to 1.00 SD Small Decrease -10.00 to -1.00 LD Large Decrease < -10.00	

Case	2030 Climate Future		2070 Climate Future	
	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
"Best"	Slightly warmer and little change in rainfall (Consensus: Very low)	Slightly warmer and wetter (Consensus: Very low)	Warmer and wetter (Consensus: Very low)	Hotter and much wetter (Consensus: Very Low)
"Worst"	Warmer and much drier (Consensus: Very low)	Warmer and much drier (Consensus: Low)	Hotter and much drier (Consensus: Low)	Much hotter and much drier (Consensus: Very low)
"Maximum consensus"	Warmer and little change in rainfall (Consensus: Moderate)	Warmer and little change in rainfall (Consensus: Moderate)	Warmer to hotter and little change to drier (Consensus: Low)	Hotter to much hotter and drier to much drier (Consensus: Low)

4.5.3 ANNUAL RAINFALL AND AVERAGE SURFACE TEMPERATURE MATRICES (STORMS)

<table>
<tr><td colspan="2">East Coast (South) Climate Futures</td><td colspan="2">Year</td></tr>
<tr><td colspan="2"></td><td>2030</td><td>2070</td></tr>
<tr><td rowspan="2">Emissions Scenarios</td><td>RCP 4.5</td><td> 
</td><td> 
</td></tr>
<tr><td>RCP 8.5</td><td> 
</td><td> 
</td></tr>
<tr><td colspan="2">Keys</td><td>Rainfall
MD Much Drier < -15.00
D Drier -15.00 to -5.00
LC Little Change -5.00 to 5.00
W Wetter 5.00 to 15.00
MW Much Wetter > 15.00
Mean Surface Temperature
MH Much Hotter > 3.00
H Hotter 1.50 to 3.00
W Warmer 0.50 to 1.50
SW Slightly Warmer < 0.50</td><td> 
</td></tr>
</table>

Case	2030 Climate Future		2070 Climate Future	
	RCP 4.5	RCP 8.5	RCP 4.5	RCP 8.5
"Best"	Much drier and warmer (Consensus: Very low)	Drier and slightly warmer (Consensus: Very low)	Much drier and hotter (Consensus: Low)	Much drier and much hotter (Consensus: Low)
"Worst"	Much wetter and warmer (Consensus: Very low)	Wetter and warmer (Consensus: Low)	Wetter and warmer (Consensus: Very low)	Much wetter and hotter (Consensus: Very low)
"Maximum consensus"	Little change and warmer (Consensus: Moderate)	Little change in rainfall and warmer (Consensus: Moderate)	Drier and hotter (Consensus: Low)	Much drier and much hotter (Consensus: Low)

5 CLIMATE RISK ASSESSMENT

The qualitative descriptions used in the risk assessment to categorise risks as low, medium, high and extreme depending on the likelihood and consequence are in accordance with the AGO's Climate Change Risks and Impacts: A Guide for Government and Business. Details of the qualitative descriptions are provided in Appendix A.

5.1 RISK ASSESSMENT TABLE

Climate Variables and Risks	Climate Projections	Potential Climate Impacts	Pre-adaptation Actions						Proposed Adaptation Actions	Post-adaptation Actions						Summary of how measures reduce risk
			2040			2070				2040			2070			
			C	L	Rating	C	L	Rating		C	L	Rating	C	L	Rating	
Hotter and dryer conditions resulting in higher frequency and/or severity of bushfire events	On balance, the projected climate scenarios indicate a summer that will be warmer in the near future and becoming hotter and drier later. In these projected scenarios, the risks of bushfire will be increased.	DIRECT: Increased bushfires risk due to warmer to hotter conditions may cause direct damage to the facilities.	Major	Unlikely	Medium	Major	Possible	High	Investigate locations of vulnerability, remove potential fuel sources surrounding the building such as removing dead vegetation as part of ongoing landscaping/maintenance works. Use of non-combustible construction materials as per regulation. Put in place evacuation plan in case of fire threatening building, with particular attention paid to the special needs of the students.	Major	Rare	Low	Major	Unlikely	Medium	The risk and impact of bushfire on the building will be reduced if good management practice are implemented. A properly considered evacuation plan will minimise the risks to occupants of the building.
		DIIRECT: Increased bushfires risk due to warmer to hotter conditions may increase exposure to smoke and particulate for staff and visitors, impacting health.	Minor	Possible	Medium	Minor	Possible	Medium	Ensure building is well sealed to minimise risks of smoke infiltration. Put in place smoke hazard management strategies. Consider providing mechanical outside air system with high quality filters that can remove smoke particulates from the air.	Minor	Unlikely	Low	Minor	Unlikely	Low	The risk and impact of smoke on occupants will be reduced if good management practice are implemented.

Hotter and dryer conditions resulting in higher frequency and/or duration of heatwaves/ extreme heat-days (over 35 degree Celsius)	On balance, the projected climate scenarios indicate a summer that will be warmer in the near future and becoming hotter and drier later. In these projected scenarios, the risks of heatwaves will be increased.	DIRECT: Extreme heat will increase demand on HVAC system and may impact the ability of HVAC system to maintain thermal comfort of occupants due to capacity constraints.	Moderate	Possible	Medium	Moderate	Likely	High	Incorporate passive thermal design principles in the design and construction of the building such as appropriate levels of shading devices thermal insulation. Provide light coloured roofs to reduce heat gains via the roof and help mitigate urban heat island effect. Provide additional photovoltaic panels to provide renewable electricity to help offset the additional HVAC electricity demand. When replacing HVAC units at the end of service life, consider upsizing capacity of units in line with change in climatic conditions.	Moderate	Possible	Medium	Moderate	Possible	Medium	The incorporation of passive thermal design principles will help mitigate extreme heat risks in the near future. Appropriate upgrade of HVAC equipment at their end of their service life will help ensure system will be capable of handling more extreme temperatures in the far future. Incorporation of PV system to help offset HVAC energy consumption and increase in electrical peak loads
		DIRECT: Extreme heat may impact the operation of electrical equipment and infrastructures due temperature to exceeding design limits.	Minor	Unlikely	Low	Minor	Possible	Medium	In the near future, current temperature ratings for electrical equipment should be able to cope with projected temperature increase relevant to the components design life. In the far future, equipment should be gradually upgraded as required to cope with more extreme conditions.	Minor	Unlikely	Low	Minor	Unlikely	Low	Appropriate upgrade of electrical equipment at their end of their service life will help ensure system will be capable of handling more extreme temperatures in the far future.
Hotter and wetter conditions increasing severity of extreme storm/wind events (by providing more fuel to increase the wind speeds of storms)	The projected climate scenarios indicate a summer that will be warmer in the near future and becoming hotter later. There is no strong consensus whether it will become wetter or drier in the near future but hotter temperature may impact on the severity of storm and wind events.	DIRECT: Stronger wind and rain events may damage the building and cause disruption of service and power failure.	Moderate	Unlikely	Medium	Moderate	Unlikely	Medium	Services design to take possible storm risk into consideration and have management strategies for extreme weather condition. Implement management strategies so that in the case of extreme weather the building services can still be in function.	Moderate	Rare	Low	Moderate	Unlikely	Medium	Services to implement strategies to mitigate impacts of storm damage to façade and building systems. Management strategies in place for extreme weather events.

5.2 RESPONSES TO HIGH AND EXTREME RISKS

The risk assessment identified two high risks for the proposed development by 2070 (Zero high risk by 2030). No extreme risks were identified. The responses to high risks are summarised as follows

1. Hotter and dryer conditions causing an increase in the frequency and/or severity of bushfire events directly damaging the building. This risk is mitigated by ensuring non-combustible building elements are used in the fabric of the building and by implementing good management practice to remove potential fuel source around the building once the building is in operation.
2. Higher maximum temperatures causing an increase in frequency and/or duration of extreme heat-days and heatwaves resulting in insufficient capacity of the HVAC system to maintain thermal comfort. This risk is mitigated by incorporate passive thermal design principles in the design and construction of the building such as appropriate levels of thermal insulation.

5.3 RISKS SUMMARY

Risk rating	2030 Pre-adaptation	2070 Pre-adaptation	2030 Post-adaptation	2070 Post-adaptation
Low	1	0	4	2
Medium	4	3	1	3
High	0	2	0	0
Extreme	0	0	0	0

The above table shows all risk items identified as 'high' or 'extreme' are addressed by specific design responses and at least two risks items identified in the risk assessment are addressed by specific design responses.

6 CONCLUSION

A Climate Change Risk & Adaptation Assessment report has been prepared for the upgrades to Rouse Hill High School in accordance with EFSG DG 2.08 and Green Star – Design & As-Built v1.3 requirements.

In particular, this Climate Change Risk & Adaptation Assessment specifically addressed:

- Details of stakeholder consultation that was undertaken during plan preparation, incorporating their responses (See Section 2.1)
- Summary of the project's characteristics (site, location, climatic characteristics) (See Section 3)
- Assessment of climate change scenarios and impacts on the project using two time scale relevant to the project anticipated lifespan (See Section 4)
- Summary of potential direct and indirect climate change impacts (environmental, social and economic) (See Section 5)
- Identification of the potential risks for the project and people based on recognised standard (See Section 5)
- A list of actions and responsibilities for 'high' and 'extreme' risks identified (See Section 5)

The impacts of climate change were assessed across two time scales (2030 & 2070) and two Representative Concentration Pathways (RCP4.5 & RCP8.5). Climate Futures matrices were used to determine the key climate projections based on multiple climate variables for this risk assessment. The key climate projections were used to inform the climate risk assessment.

The results of the climate risk assessment identified two high risks items pre-adaptation. These high risks were mitigated to medium risks by the proposed adaptation actions.

6.1 MITIGATION MEASURES

The following Table 2 captures all measures required to be implemented as a result of this Climate Change Risk & Adaptation Assessment report and Table 1 (see Introduction). Due to the quantity of mitigation measures resulting from this report, they have been generalised below. For a detailed overview of the measures refer to Section 5.

Table 2 – Mitigation Measures

Mitigation Number/Name	When is Mitigation Measure to be complied with	Mitigation Measure	Reason for Mitigation Measure
Climate change adaptation and mitigation measures	Prior to commencement of construction works: All disciplines to incorporate mitigation measures in their Construction Documentation (enforced by ESFG and GS frameworks).	Climate Change Risks and Impacts Adaptations/ Responses (see Section 5)	To ensure climate change adaptation is addressed. To ensure any climate change risks are managed. To ensure high risks are mitigated to medium risks.
	Prior to commencement of operation: All disciplines to provide as-built package reflecting what's has been built is aligned with CC documentations (enforced by ESFG and GS frameworks).		

6.2 EVALUATION OF ENVIRONMENTAL IMPACTS

With regards to Table 1 and Table 2, the environmental impacts caused by the development are adequately mitigated through the recommended measures and are not considered to be a significant impact.

APPENDIX A – RISK ASSESSMENT FRAMEWORK

The following risk assessment framework is used to determine consequence and likelihood ratings. Based on these ratings, the risk rating has been determined.

CONSEQUENCE CRITERIA

Rating	SUCCESS CRITERIA				
	Public safety	Local economy & growth	Community & lifestyle	Environment & sustainability	Public administration
Catastrophic	Large numbers of serious injuries or loss of lives	Regional decline leading to widespread business failure, loss of employment and hardship	The region would be seen as very unattractive, moribund and unable to support its community	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage	Public administration would fall into decay and cease to be effective
Major	Isolated instances of serious injuries or loss of lives	Regional stagnation such that businesses are unable to thrive and employment does not keep pace with population growth	Severe and widespread decline in services and quality of life within the community	Severe loss of environmental amenity and a danger of continuing environmental damage	Public administration would struggle to remain effective and would be seen to be in danger of failing completely
Moderate	Small numbers of injuries	Significant general reduction in economic performance relative to current forecasts	General appreciable decline in services	Isolated but significant instances of environmental damage that might be reversed with intensive efforts	Public administration would be under severe pressure on several fronts
Minor	Serious near misses or minor injuries	Individually significant but isolated areas of reduction in economic performance relative to current forecasts	Isolated but noticeable examples of decline in services	Minor instances of environmental damage that could be reversed	Isolated instances of public administration being under severe pressure
Insignificant	Appearance of a threat but no actual harm	Minor shortfall relative to current forecasts	There would be minor areas in which the region was unable to maintain its current services	No environmental damage	There would be minor instances of public administration being under more than usual stress but it could be managed

LIKELIHOOD CRITERIA

Rating	Recurrent risks	Single events
Almost certain	Could occur several times per year	More likely than not – Probability greater than 50%.
Likely	May arise about once per year	As likely as not – 50/50 chance.
Possible	May arise once in ten years	Less likely than not but still appreciable – Probability less than 50% but still quite high.
Unlikely	May arise once in ten years to 25 years	Unlikely but not negligible – Probability low but noticeably greater than zero.
Rare	Unlikely during the next 25 years	Negligible – Probability very small, close to zero.

RISK PRIORITY LEVELS

	Consequences				
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	Medium
Rare	Low	Low	Low	Low	Medium

The interpretation of the priority levels is usually as follows:

- Extreme risks demand urgent attention at the most senior level and cannot be simply accepted as a part of routine operations without executive sanction.
- High risks are the most severe that can be accepted as a part of routine operations without executive sanction but they will be the responsibility of the most senior operational management and reported upon at the executive level.
- Medium risks can be expected to form part of routine operations but they will be explicitly assigned to relevant managers for action, maintained under review and reported upon at senior management level.
- Low risks will be maintained under review but it is expected that existing controls will be sufficient and no further action will be required to treat them unless they become more severe.