Murwillumbah Education Campus

ESD Report

Project No.	P00106
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E-LAB Consulting

Where science and engineering inspire design.

Document QA and Revisions

DESIGN FINALISATION

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
1	14/10/2021	Preliminary	GB	GB
2	02/12/2021	Final for SSDA	GB	GB
3	11/03/2022	Updated Project Description	GB	GB
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Sustainability

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1 EXECUTIVE SUMMARY

This report has been prepared by E-LAB Consultants on behalf of Built NSW Pty Ltd for the Murwillumbah Education Campus development. It provides an overview of the sustainability strategy and elements of the design implemented to demonstrate excellence in sustainability for the Murwillumbah Education Campus.

The report addresses Item 6 of the Secretary's Environmental Assessment Requirements for the development, including:

- How ESD principles, as defined within clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000, are incorporated into the design and ongoing phases of the project
- Proposed measures to minimise consumption of resources, water and energy
- How the development is designed to consider best practice sustainable building principles, including a pathway to achieve a 4 Star Green Star Design & As Built v1.3 rating
- How the development incorporates environmental design in accordance with the GANSW Environmental Design In Schools Manual
- How the development is responsive to the NARCliM projected impacts of climate change

Through the inclusion of the various sustainability initiatives outlined in this report, the project clearly puts sustainability at the forefront of the design and addresses the requirements of Item 6 of the SEARs.

2 INTRODUCTION

The Murwillumbah Education Campus development, involves the co-location of Murwillumbah Primary School, Murwillumbah East Primary School, Murwillumbah High School, and Wollumbin High School, to establish a new primary school and a new high school as part of the same education campus.

The project will include the following scope of works within the SSD application:

- Demolition of Building E
- All inground slabs, pathways, hardstands and footings including those to buildings B, C, D, G, H, M, P, S, AW and AZ
- Associated ground works required to facilitate the construction of new buildings and landscaped areas
- Construction of new Buildings 1, 2, 3 and 4:
- Building 1 – New public school building comprising general learning spaces, administration, canteen, School Support Unit (SSU) and library;
- Building 2 – Hall building including a public school hall, out of school hours care (OSHC) facilities, high school hall/gymnasium and other spaces for physical education and creative and performing arts (CAPA);
- Building 3 – New high school building including the following facilities; general and specialist learning spaces, SSU, and library.
- Building 4 - New high school building including the following facilities; science, support, administration and canteen;
- Refurbish Building A for DoE offices and school community health facilities along with associated access requirements. Building A is a locally listed heritage building and will be retained and refurbished;
- Refurbishment of Building F to provide learning space for agricultural education;
- Retention of existing AY.
- Creation of new public school and high school outdoor learning spaces to support future focused learning outcomes;
- New landscaping and embellishment of outdoor playgrounds;
- Civil and infrastructure works; and
- Kiss n drop and parking off Nullum Street

2.1 SITE AND LOCATION

The Murwillumbah High School is located at 86 Riverview St, Murwillumbah and is legally defined as Lot 2 in DP 578679 and Lots 5 and 6 in DP 820602. The school site is located within the Tweed Shire Council Local Government Area (LGA) and the land is owned by the NSW Department of Education (DoE).

Figure 1 identifies the proposed site and the four schools which are proposed to come together to create the Murwillumbah Education Campus. Figure 2 identifies the existing site boundary and site layout.

Figure 1: Site location (Source: Google Maps)

Figure 2: Aerial view of the Subject site (Source: SIX Maps)

2.2 SITE DESCRIPTION

The school site is irregular in shape and has a total area of approximately 11.7ha. It is located approximately 1km from the Murwillumbah town centre and to the south of a well-established suburban area with residential properties. The site is bordered on the east, south and west by open rural landscape and is approximately 500 metres from the Tweed River. The school is bound by Riverview Street, High School Lane, Nullum Street and residential structures to the north; grassland/farmland to the west and south; and sports fields to the east.

The school currently comprises eleven (11) permanent buildings, as well as an off-street staff car park, various playgrounds, sports ovals, sport courts and green space.

3 RESPONSE TO SEARS

Item 7 of the Secretary's Environmental Assessment Requirements (SEARs) lists requirements as outlined per the table below. A reference to how each item is addressed within this report is provided.

ITEM DESCRIPTION	DOCUMENT REFERENCE
How ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) would be incorporated in the design and ongoing operation phases of the development	Refer to Section 4.2
Describe proposed measures to minimise consumption of resources, water (including water sensitive urban design) and energy	Refer to Sections 4.3, 4.4, 4.5 and 4.6
Detail how the future development would be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy.	Refer to Sections 4.3, 4.4, 4.5 and 4.6
Show how environmental design will be achieved in accordance with the GANSW Environmental Design in Schools Manual (GANSW, 2018)	Refer to Section 6
Include an assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.	Refer to Section 5
Include a statement regarding how the design of the development is responsive to the NARCliM projected impacts of climate change	Refer to Section 8
An Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design	Refer to Civil Engineer report.

4 SUSTAINABILITY INITIATIVES

4.1 OBJECTIVES

To demonstrate excellence in sustainability, the Murwillumbah Education Campus development is targeting the following sustainability outcomes:

- Aligning the overall vision of the project with the ESD principles outlined in the Environmental Planning and Assessment Regulation
- Compliance with the Educational Facilities Standards and Guidelines (EFSG) by the Department of Education
- Exceeding the requirements of Section J of the National Construction Code 2019
- A 4 Star Green Star Design & As Built v1.3 certified outcome
- Inclusion of initiatives to minimise energy and water demand and minimising overall environmental impacts.

4.2 ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION – CLAUSE 7(4)

The principles of ecologically sustainable development (as documented within the Environmental Planning and Assessment Regulation 2000) are fundamental drivers for this project. The following provides a direct response to the specific principles as follows:

- **The precautionary principle**

  Serious or irreversible damage to the environment is being avoided through the use of previously developed land for the site. The proposed development is to be located on the existing Murwillumbah High School site and therefore the risk of creating environmental damage is considered to be very low.

  An Environmental Management Plan is to be developed by the Head Contractor for the project to implement measures during construction to minimise impacts on the environment.

  A Climate Change Adaptation assessment will be carried out, in accordance with EFSG DG02.08 to ensure the design of the building focuses on adaptability and resilience.

- **Inter-generational equity**

  To ensure equity in health, diversity and productivity of the environment between this and future generations, the development is carrying out a Climate Change Adaptation assessment to address any impacts climate change will have on the site. Details of this assessment are included in Section 8. In addition, material selections have been made to ensure that low-emitting materials are used. Landscaping is designed to add ecological value to the site and preserve environmental health.

- **Conservation of biological diversity and ecological integrity**

  The development will be designed to ensure biological diversity and ecological value is improved for the site via careful landscape design. Per EFSG DG90.06 Landscape Design – Sense of Place and DG02.06 Ecological Conservation, special emphasis will be placed on retention of existing landscaping, and the introduction of a diverse range of landscaping. A comprehensive Arboricultural impact assessment has been carried out on the existing trees and measures have been put in place to retain several existing trees.

- **Improved valuation, pricing and incentive mechanisms**

  The project will include a number of measures to internalise pollution and consider the life cycle cost of systems. Per the EFSG DG01.03, all design considerations must take into account whole of life, including maintenance, access, quality, life span, future improvements and sustainability.

4.3 ENERGY EFFICIENCY

Energy consumption on the site will be minimised through excellent design and performance. In order to maximise the overall energy efficiency of the site, demand must first be reduced, then systems must be designed in the most efficient manner. On-site renewable energy should be maximised to the full potential on the site. It is only then that projects should look to offset using purchased carbon offsets.

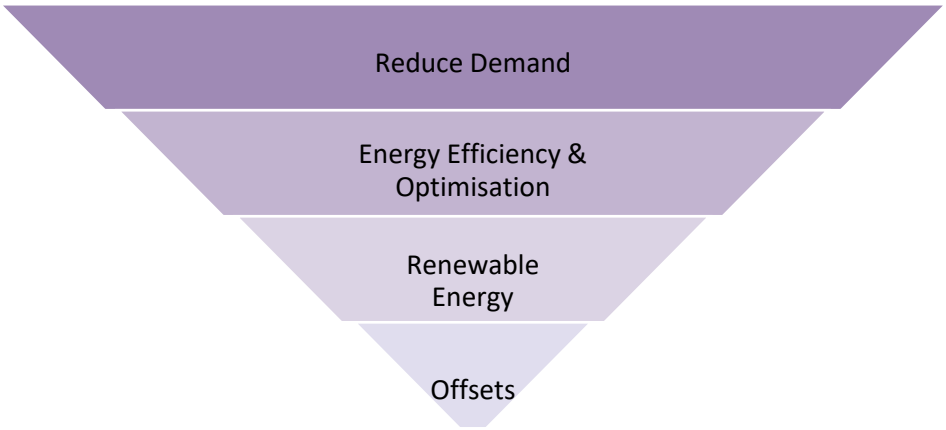

Figure 1 Hierarchy of Design - Energy Efficiency

4.3.1 High Performance Building Fabric

The building fabric has been carefully designed using a combination of solid elements and glazing. Shading devices, overhangs and screens all serve to control heat gains through the façade in summer whilst maintaining good daylight and views

Figure 2: Screens and careful design of window to wall ratios

The glazing performance will be a low-e system. This system is designed to reduce heating and cooling loads and complies with NCC 2019 Section J requirements for building fabric. It will also deliver greater comfort in the space to users, reduce energy consumption and improve indoor quality.

4.3.2 Design for Manufacture and Assembly (DfMA)

A key component of this development is a design for manufacture and assembly system. This system allows elements like insulation and thermal bridging to be addressed upfront and incorporated directly into the offsite manufacture of components. This improves the overall thermal performance of the facade system. The depth of the grid system uses also serves to maximise cross flow ventilation.

4.3.3 Natural & Mixed Mode Ventilation

Circulation and communal spaces will be designed to operate as naturally ventilated spaces. The buildings have been designed to allow air to flow between buildings and through assembly, COLA and covered walkway areas. This reduces the overall energy consumption of the development.

Air conditioning will be provided to accommodate heating and cooling at peak times of the year; however, each classroom and learning area will be provided with an Indicator Panel to advise occupants when conditions are suitable to open the windows. This will minimise air conditioning use when external conditions are suitable and serve to reduce the overall energy consumption.

4.3.4 Renewable Energy

In line with EFSG DG 66, the project has been designed to incorporate photovoltaic systems on the roof. A 70kW system is anticipated to be provided to the high school and 25kW system to the primary school. This will produce onsite renewable energy to reduce energy costs and provide an educational piece for students and staff.

4.3.5 Lighting

High efficiency LED lighting systems are to be provided as per the requirements of SG951 within the EFSG. This along with lighting control measures such as occupancy sensors and daylight sensors will aid in reducing the overall lighting energy demand.

4.3.6 Energy Metering and Monitoring

An energy metering and monitoring system will be incorporated to measure and monitor the main energy uses within the development. This will allow faults to be detected in a timely manner and rectification to occur to minimise wasted energy use.

4.4 WATER EFFICIENCY

Several considerations have been made to use and discharge water responsibly to improve the development's impact on the water cycle. The EFSG nominates several features in DG53, DG95, SG811, SG812 and SG821 which will be incorporated, including:

- The following **water efficient fixtures** will be targeted:
  - 6 Star WELS rated taps
  - 4 Star WELS dual flush toilets
  - Showers <7.5L/min
  - Urinals will be maximum 0.8L/flush (6 Star WELS)
- **Rainwater harvesting and use** will be incorporated to maximise non-potable water usage on site
- **Landscaping** will be designed to be low water use, with the following to be implemented:
  - Incorporation of native and low maintenance vegetation
  - Irrigation supply from non-potable water sources
  - Sub soil drip irrigation systems to minimise evaporation
- **Water Sensitive Urban Design** is a strong focus for the development, especially due to the steep nature of the site. Several strategies have been put in place to ensure water is intercepted and filtered before it reaches waterways and reduces overall stormwater discharge. The use of rocks and plants will be used in parallel with onsite water detention and filtration systems to minimise the impacts on council stormwater systems

4.5 DFMA & RESOURCE EFFICIENCY

Construction materials are a highly carbon intensive component of any development. They often involve very energy intensive production processes, large amounts of raw materials including water and energy, and long transport distances to reach the location of the development. The use of the design for manufacture and assembly system for this project brings about significant sustainability benefits. The DfMA system is a process which combines the manufacture of building components, such as walls and facades, in a factory environment. These components are brought onto site and assembled, resulting in a more efficient construction methodology. Several sustainability benefits arise out of this process:

- Reduced material waste – the modularity of the system allows materials to be precisely manufactured and ordered. There are fewer off cuts of materials such as plasterboard, insulation, piping and joinery as grids are standardised and due to precision manufacturing.
- Less impacts of site activities – reduced construction time in turn means less impacts on the site environment. Fuel emissions, noise disturbance is drastically reduced.
- Construction precision – the modular and pre-fabricated nature of the system allows for more efficient thermal construction minimising thermal bridging and reducing overall operational energy demand.

4.6 INDOOR ENVIRONMENT QUALITY

Improved indoor environment quality is a significant by-product of sustainable building design. The architectural design provides significant consideration to the incorporation of elements to improve indoor environment quality:

- **Covered walkways** have been designed to allow students to move between buildings while being protected from the elements, while providing a connection to nature that indoor corridors are unable to provide.

- **Views** have been considered for each of the buildings to optimise access to the outdoor environment while balancing that with thermal control
- **Daylight glare** is minimised through the use of screens and overhangs on each façade
- **Artificial lighting** will be designed appropriately to minimise glare reduction and providing adequate illuminance levels. This will be done through careful luminaire selection and placement.
- **Acoustic comfort** will be optimised to ensure internal noise levels, reverberation levels and separation levels are achieved in line with best practice standards.
- **Materials and finishes** will be selected to be low-VOC and low formaldehyde to minimise off-gassing and provide a better quality environment for staff and students.

5 GREEN STAR

The development will be targeting a **4 Star Green Star Design & As Built v1.3 certified rating**. This reflects 'national best practice sustainable building principles' as a minimum performance requirement.

Widely considered as the benchmark environmental assessment tool within the Australian Property Industry, Green Star is an independent accreditation framework which delivers sustainable built outcomes throughout the project lifecycle. Green Star is a credits-based star rating system ranging from one through to six stars.

Green Star assesses the environmental performance of projects in design, construction and operation via the following category frameworks:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land use & Ecology
- Emissions; and
- Innovation

The project has been assessed against the Green Star framework and the following table outlines the preliminary scorecard for the development:

CATEGORY	POINTS AVAILABLE	POINTS TARGETED
Management	14	13
Indoor Environment Quality	17	11
Energy	22	8
Transport	7	2
Water	12	6
Materials	12	6
Land Use & Ecology	6	2
Emissions	5	4
Innovation	10	6
Total	**110**	**58**

Refer to Appendix A for the full Green Star Pathway.

6 NCC 2019 SECTION J

Section J of the National Construction Code 2019 relates to the energy efficiency of buildings. Section J is a minimum performance target for standard buildings and specifies minimum deemed-to-satisfy (DTS) requirements, for building fabric and services.

The proposed development aims to demonstrate compliance with the requirements using a JV3 methodology to allow for the intricacies of the project design.

The development is located within the NCC Climate Zone 2, which is considered the 'warm humid summer, mild winter' climate. The following overall performance values are expected for the design:

ELEMENT	MINIMUM PERFORMANCE
Roof/ceiling	R3.7 m2/K/W (downward heat flow) with solar absorptance <0.45
External walls	R1.0 m2/K/W (including the impacts of thermal bridging)
Internal walls	R1.4 m2/K/W (including the impacts of thermal bridging)
Suspended floor slabs	R2.0 m2/K/W (upwards and downwards heat flow)
Slab on ground	None
Glazing	U Value 4.2 SHGC 0.45

The above will be confirmed in design development utilising the JV3 modelling methodology.

7 GOVERNMENT ARCHITECT NSW ENVIRONMENTAL DESIGN IN SCHOOL

The Environmental Design in Schools guideline produced by the Government Architect NSW (GANSW) outlines a number of key impact categories and initiatives design to improve the environmental performance as well an improve the quality of schools' design for the students, staff and stakeholders.

The NSW Government Architect guide generally outlines a number of key performance indicators, including:

- Air
- Comfort
- Light
- Noise
- Water
- Energy
- Landscape; and
- Materials

7.1 AIR

The project aims to provide natural ventilation and mixed mode systems where possible to allow the build-up of carbon dioxide and pollutants to be ventilated. The use of air conditioning systems will also aid in controlling humidity and therefore control mould growth within systems.

Natural ventilation is to be provided in circulation areas and covered walkways are proposed to passively cool and ventilate these spaces and minimise the use of air conditioning. The depths of each space has been carefully considered to promote the flow of air through each space.

7.2 COMFORT

Passive design, window placements and external shading are a strong focus of this development's design. The use of solar control glazing and design of window to wall ratios have been optimised to control solar gain in summer and allow passive heating in winter. The provision of covered outdoor learning areas also provides shaded external spaces to provide a more comfortable space for staff and students.

7.3 LIGHT

Natural light is optimised via a dedicated design response to include optimum levels of natural daylight to all dedicated teaching and learning zones. The following plan demonstrates the positioning of teaching and learning areas to maximise daylight, and a facade which incorporates high-performance glazing and a responsible ratio of window-to-wall area to maximise energy performance. The balance of light and energy has been carefully considered through a vernacular architecture response.

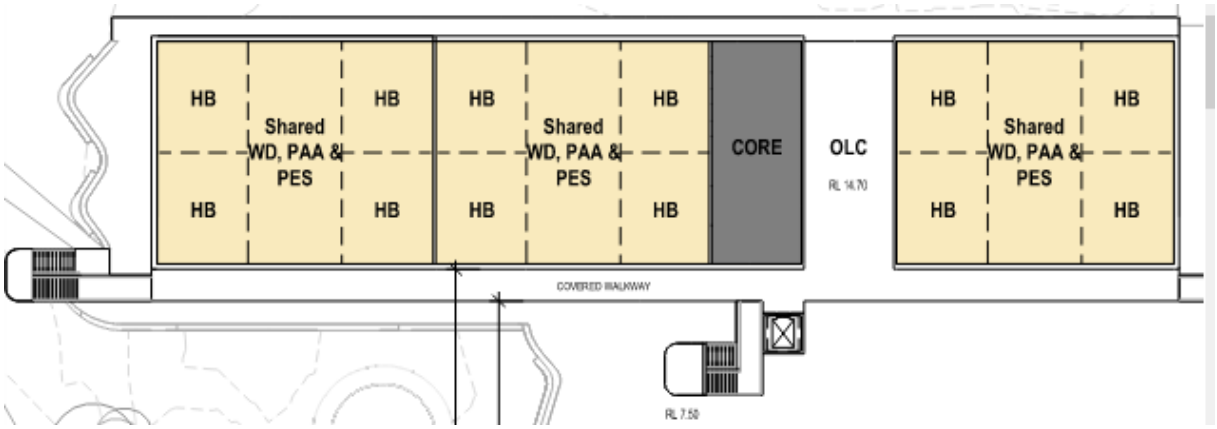

Figure 3: Positioning of teaching & learning spaces to maximise natural daylight

Providing optimum levels of natural daylight to learning spaces is known to benefit concentration, productivity and physical comfort for students. The south-facing high-level skylights provide diffuse daylight with good natural colour rendering into the space and a connection to the outdoors without direct solar heat gains

7.4 NOISE

Noise shall be mitigated and managed via a dedicated Acoustic design response. In addition to the Government Architect Environmental design guide and the EFSG, the performance requirements identified within Green Star are to be included within the project design as part of the 4 Star Green Star Design & As Built v1.3 strategy.

7.5 WATER

Potable water use is to be minimised and non-potable water use maximised through the incorporation of high efficiency fixtures, rainwater reuse systems and careful landscape design. Stormwater and Water Sensitive Urban Design is also a strong focus for the development. Refer to Section 4.4 for detailed efficiency measures. The project's commitment to Green Star certification also demonstrates this aspect will be addressed.

7.6 ENERGY

The development has been designed with energy efficiency features to minimise energy demand, provide on site renewables and through building fabric design. Refer to Section 4.3 for a detailed list of passive design solution and energy efficiency measures.

7.7 LANDSCAPE

The landscape response for the development includes consideration of native vegetation and a strong focus on cultural and appropriate planting to maintain the site's ecology and minimise the ongoing environmental impact of the project.

7.8 MATERIALS

A great level of consideration has been given to minimisation of materials for the development. The Design for Manufacture and Assembly process proposed for this development will significantly reduce material wastage and carbon footprint of the project. In addition, the project will be utilising low emissions and environmentally friendly finishes and materials as part of the Green Star target for the project.

8 CLIMATE CHANGE RESILIENCE STATEMENT

As part of the Green Star response for the development and in line with EFSG requirements, the project will be evaluated using a full climate adaptation and risk assessment as per AS 5334-2013 and Green Star Design & As Built v.13 to determine the design responses to be incorporated in the development.

As part of the initial design response for the project, a preliminary assessment of project risks associated with the predicted impacts of Climate Change has been undertaken for the proposed development. The assessment has been undertaken to ensure the project design allows for suitable provisions for the predicted impact of climate change scenarios. The NSW Government's NSW and ACT Regional Climate Modelling (NARCliM) projections for the North Coast were used. The results showed the following:

CATEGORY	2020 – 2039	2060 - 2079
Maximum temperatures	+ 0.4 – 1.0°C	+ 1.5 – 2.4°C
Minimum temperatures	+ 0.5 – 1.0°C	+ 1.6 – 2.5°C
Number of hot days	Increase	
Number of cold nights	Decrease	
Winter rainfall	Decrease	
Autumn and spring rainfall	Increase	
Average fire weather in spring and summer	Increase	
Severe fire weather in spring and summer	Increase	

The project team will undertake a full climate adaptation and risk assessment to define the risks and identify any high and extreme risk items. A workshop will be conducted with all stakeholders to establish design strategies to mitigate the risks. At this stage, the following strategies have been implemented to respond to the NARCliM projections for the site:

- Passive design features including shading, overhangs and solar control to reduce the impacts of increasing temperatures
- Mixed mode ventilation systems with air conditioning during peak times to ensure appropriate internal conditions are maintained for student and staff wellbeing
- Light coloured surfaces and landscaping to reduce heat island impacts
- Low water use landscaping and high efficiency WELS fixtures to minimise potable water consumption during periods of low rainfall
- Consideration of increased drainage capacities to reduce flooding associated with greater rainfall in autumn and spring

9 SUMMARY

The sustainability initiatives outlined in this report demonstrate how the Murwillumbah Education Campus meets the objectives of the SEARs and the Department of Education. This includes:

- How ESD principles, as defined within clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000, are incorporated into the design and ongoing phases of the project
- Proposed measures to minimise consumption of resources, water and energy
- How the development is designed to consider best practice sustainable building principles, including a pathway to achieve a 4 Star Green Star Design & As Built v1.3 rating
- How the development incorporates environmental design in accordance with the GANSW Environmental Design In Schools Manual
- How the development is responsive to the NARCliM projected impacts of climate change
- Compliance with the principles of the Educational Facilities Standards and Guidelines (EFSG)

The development is committed to sustainability through the provision of various sustainability initiatives as well as the targeting of a 4 Star Green Star Design & As Built v1.3 rating. As such, the project clearly puts sustainability at the forefront of the design and addresses the requirements of Item 6 of the SEARs.

Appendix A **GREEN STAR PATHWAY**

Green Star - Design & As Built Scorecard

Project:	**Murwillumbah Education Campus**
Targeted Rating:	**4 Star - Best Practice**

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Project: P00106
MEC

Core Points Available	Total Score Targeted
100	65

CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Management				14	
Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional	1	1
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets	-	Complies
		2.1	Services and Maintainability Review	1	1
		2.2	Building Commissioning	1	
		2.3	Building Systems Tuning	1	1
		2.4	Independent Commissioning Agent	1	1
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2	2
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information	1	1
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	1
		5.2	End of Life Waste Performance	1	1
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies
		6.1	Monitoring Systems	1	1
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	Complies
		7.1	Environmental Management System	1	1
		7.2	High Quality Staff Support	1	1
Operational Waste	A. Performance Pathway	8A	Performance Pathway: Specialist Plan	1	1
Total				14	13
Indoor Environment Quality				17	
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1
		9.2	Provision of Outdoor Air	2	
		9.3	Exhaust or Elimination of Pollutants	1	1

Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1	1
		10.2	Reverberation	1	1
		10.3	Acoustic Separation	1	
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	Complies
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	1	1
			11.1.2 Glare Reduction		
		11.2	Surface Illuminance	1	
		11.3	Localised Lighting Control	1	
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	Complies
		12.1	Daylight	2	1
		12.2	Views	1	1
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	1	1
			13.1.2 Carpets		
		13.2	Engineered Wood Products	1	1
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1	1
		14.2	Advanced Thermal Comfort	1	
Total				**17**	**10**

Energy				**22**	
Greenhouse Gas Emissions	E. Reference Building Pathway	15E.0	Conditional Requirement: Reference Building Pathway	-	Complies
		15E.1	GHG Emissions Reduction: Building Fabric	4	
		15E.2	GHG Emissions Reduction	16	6
		15E.3	Off-Site Renewables	8	
		15E.4	District Services	7	
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan	1	
			15E.5.2 Fuel Switching	2	TBC
			15E.5.3 On-Site Storage	1	
Peak Electricity Demand Reduction	B. Performance Pathway	16B	Modelled Performance Pathway: Reference Building	2	2
Total				**22**	**8**

Transport				10	
Sustainable Transport	A. Performance Pathway	17A	Performance Pathway	10	2
Total				**10**	**2**

Water				12	
Potable Water	A. Performance Pathway	18A	Potable Water - Performance Pathway	12	6
Total				**12**	**6**

Materials				14	
Life Cycle Impacts	A. Performance Pathway - Life Cycle Assessment	19A.1	Comparative Life Cycle Assessment	6	3
		19A.2	Additional Reporting	4	2
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	-	Complies
				1	1
		20.2	Timber	1	
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	3	3
Construction and Demolition Waste	A. Fixed Benchmark	22.0	Reporting Accuracy	-	Complies
		22A	Fixed Benchmark	1	1
Total				**14**	**11**

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

Emissions				5	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge	1	1
		26.2	Stormwater Pollution Targets	1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-	Complies
		27.1	Light Pollution to Night Sky	1	1
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28	Legionella Impacts from Cooling Systems	1	1
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	1	
Total				**5**	**4**

Innovation				10	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process	10	1
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in	30B	Market Transformation		1
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks		1
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge		6
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of	30E	Global Sustainability		
Total				**10**	**9**

TOTALS	AVAILABLE	TARGETED
CORE POINTS	100	56.0
CATEGORY PERCENTAGE SCORE		56.0
INNOVATION POINTS	10	9.0
TOTAL SCORE TARGETED		65.0

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