Westmead Catholic Education Campus ESD Report

For WINIM Developments Pty Ltd

Revision	Date	Description	Author	Reviewer
0	28/01/2020	Preliminary Issue	AS	JL

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Executive Summary

This report supports a State Significant Development Application for the Westmead Catholic Community (WCC) at 2 Darcy Road, Westmead.

The WCC project seeks to meet the needs of the growing population within the region by providing upgraded school facilities for Mother Teresa and Sacred Heart Primary Schools, as well as a new Parish church. WCC is a collaboration between Catholic Education Diocese of Parramatta (CEDP), the Diocese of Parramatta (DoP), the Sisters of Mercy and the Marist Brothers Province of Australia.

As the proposal is for the purposes of alterations and additions to an existing school and has a capital investment value in excess of $20 million, it is State Significant Development (SSD) for the purposes of the Environmental Planning and Assessment Act 1979 (the Act). The Parish church is also SSD under clause 8(2)(a) of State Environmental Planning Policy (State and Regional Development) 2011 as it forms part of the proposal which comprises a single, integrated development with significant functional links between the education and church uses.

This report will address the following SEARS requirements:

- Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) will be incorporated in the design and ongoing operation phases of the development.
- Include a framework for how the future development will 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.
- Demonstrate how environmental design will be achieved in accordance with the GANSW Environmental Design in Schools Manual.
- Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance.
- 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.
- Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:
    - Hotter days and more frequent heatwave events
    - Extended drought periods
    - More extreme rainfall events
    - Gustier wind conditions
    - How these will inform landscape design, material selection and social equity aspects (respite/shelter areas).

This report summarised the sustainable design principles for the development. Reference and benchmarking are made to the following standard and best practice guidelines:

- Green Star Design & As-Built framework by the Green Building Council of Australia (GBCA)
- NSW Climate (NARCliM) projections by NSW Department of Planning, Industry and Environment
- Government Architect New South Wales (GANSW) Design Guide for Schools & Environmental Manual
- Catholic Education Diocese of Parramatta (CEDP) Design Principles & Guidelines

Introduction

This report supports a State Significant Development Application for the Westmead Catholic Community (WCC) at 2 Darcy Road, Westmead.

The WCC project seeks to meet the needs of the growing population within the region by providing upgraded school facilities for Mother Teresa and Sacred Heart Primary Schools, as well as a new Parish church. WCC is a collaboration between Catholic Education Diocese of Parramatta (CEDP), the Diocese of Parramatta (DoP), the Sisters of Mercy and the Marist Brothers Province of Australia.

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In this development, key sustainability (or ESD) design principles have been targeted in accordance to the following industry recognised best practise standard and framework:

- 4 star Green Star Design & As-Built rating (equivalent to Australian Best Practise)
- Climate responsive design in line with NSW climate projections for 2020 – 2039

In line with the Catholic Education Diocese of Parramatta (CEDP) Design Principles & Guidelines and the NSW Government's Education Facilities Standards and Guidelines (EFSG), the education building is benchmarking against 4 star Green Star rating targets with equivalent ESD principles adopted site-wide across the development throughout the stages. The sustainability pathway of these ESD design principles is attached in Appendix A.

Description of Proposed Development

The State Significant Development application will seek approval for:

- A primary school with capacity for approximately 1,680 students, to provide expanded facilities for the existing Mother Teresa Primary School on the site and to replace the existing Sacred Heart Primary School at Ralph Street;
- A new Parish church;
- A Catholic early learning centre (fit-out within an existing building);
- New landscaping.

Reference Documents

Drawings

This report is based on the following architectural drawings received –

Architect: Alleanza Architecture
Level 1/695-699 George Street,
Haymarket NSW 2000

The relevant documents and drawings used in compiling this report are as follows:

Project Reference No.	Drawing No.	Rev.	Title
19122	MP-DA-100	A	Site Plan
19122	MP-DA-150	A	Site Analysis

19122	MP-DA-200	A	Site Sections
19122	MP-DA-300	A	Site Elevations
19122	K6-DA-100	A	Ground Floor Plan
19122	K6-DA-101	A	Floor Plan – Level 01
19122	K6-DA-102	A	Floor Plan – Level 02
19122	K6-DA-103	A	Floor Plan – Level 03
19122	K6-DA-104	A	Floor Plan – Level 04
19122	K6-DA-105	A	Floor Plan – Level 05
19122	K6-DA-106	A	Roof Plan
19122	K6-DA-200	A	Sections – Sheet 1
19122	K6-DA-201	A	Sections – Sheet 2
19122	K6-DA-300	A	Elevations
19122	K6-DA-301	A	Elevations
19122	CH-DA-01	A	Site Plan
19122	CH-DA-100	A	Parish Church Floor Plan
19122	CH-DA-101	A	Roof Plan
19122	CH-DA-200	A	Sections
19122	CH-DA-201	A	Sections
19122	CH-DA-300	A	Elevations – Sheet 1
19122	CH-DA-301	A	Elevations – Sheet 2
19122	CH-DA-302	A	Elevations – Sheet 3
19122	CH-DA-400	A	External Materials & Finishes – Sheet 1
19122	CH-DA-401	A	External Materials & Finishes – Sheet 2

Table 1: Reference documents

Requirements and Responses

Environmental Planning & Assessment Regulation 2000

SEARS Requirements

- Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) will be incorporated in the design and ongoing operation phases of the development.

Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 states:

*a) the **"precautionary principle"**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options.

*b) **"inter-generational equity"**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

*c) **"conservation of biological diversity and ecological integrity"**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*

*d) **"improved valuation, pricing and incentive mechanisms"** , namely, that environmental factors should be included in the valuation of assets and services, such as:*

(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Precautionary Principle

There are no significant perceived threats of serious or irreversible environmental damage as a result of the development.

The CSIRO projected impacts of climate change relating to this site have been considered, with the highest risks being an increase in maximum temperatures, extended drought periods and the frequency of heatwave events.

The built form shall embrace sustainability principles and will be designed and arranged to maximise the passive performance of the building.

This shall be achieved through the harnessing of natural daylight and natural ventilation to reduce energy consumption of air conditioning systems, in turn reducing carbon emissions.

Heat load control is managed by climate responsive façade design. Mitigation strategy such as overhangs, vertical screening, well insulated building fabric and glazing solutions that are customised to suit the needs of respective space have been considered and adopted. These design approach shall assist to reduce solar gain which in turn contribute to reducing the greenhouse gas emissions of the building. Further optimisation will be carried out progressively throughout the design development.

Meanwhile, the flat roof profile provides potential opportunity for solar photovoltaic consideration. The rooftop solar photovoltaic will not only reduce the reliance on electricity grid but also serve as urban heat island mitigation strategy for the development.

The proposed use of the development is associated with low risks of environmental consequences, given that it has predominantly the same use as the current buildings on site. As such, it is anticipated that no serious or irreversible damage is expected from the operation of the proposed development.

Inter-generational equity

To preserve or enhance the health, diversity and productivity of the environment for our future generations, the Indoor Environmental Quality as well as the proposed landscape design of the development will be considered as to ensure the health and well-being of its occupants as well as to encourage them to actively engage with their surroundings.

The proposed development is recommended to adopt the following passive design principles to maintain optimal occupant comfort and safety which in turn encourages and conserves inter-generational equity:

- Design of facades that respond to local climate including sun, wind and aspect;
- Use of natural ventilation and mixed-mode air conditioning, providing high levels of fresh air with reduced energy consumption whenever applicable;
- High levels of natural daylight through windows and skylights;
- High levels of thermal insulation;
- Sunshades (both horizontal and vertical);
- Robust and durable external building materials;
- Usage of low total VOC paints, sealants, adhesives and floor coverings;
- Acoustic separation between different spaces for acoustic comfort.

Conservation of biological diversity and ecological integrity

As this is a previously developed site, the construction of the development is anticipated to have insignificant impact on the current level of biological diversity and ecological integrity. This is in line with the Flora and Fauna Assessment report no. 19208RP1 by Cumberland Ecology.

Improved valuation, pricing and incentive mechanisms

Sustainable strategy in line with 4 star Green Star pathways shall form part of the tender documents. This is to ensure that targeted sustainable initiatives are captured in design, reducing the risk from last minute design changes. Contractors shall be required to provide and abide by an Environmental Management Plan and Environmental Management System in accordance with NSW Environmental Management Systems Guidelines or equivalent standard.

ESD Framework – Green Star rating

SEARS Requirements

- Include a framework for how the future development will 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.
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4 Star Green Star Design & As-Built Rating Benchmark

For the purpose of benchmarking to industry best practise, the Green Star – Design & As Built rating tool has been used for this project to guide the design towards achieving a 4 star Green Star rating equivalent to Australian Best Practice. The Green Star evaluates the sustainability initiatives of design, projects and/or buildings based on a number of criteria, including energy and water efficiency, indoor environmental quality and resource conservations.

Table 2 outline the sustainability strategy and approach for the development based on the nine Green Star categories and a score card demonstrating 4 star Green Star pathways is attached in Appendix A:

Category	Sustainability Strategy/ Approach
Management	• GSAP engaged from early design stage i.e. Concept Design. • Owner's commitment to set environmental performance targets, and provide ongoing metering, monitoring and improvement of energy and water consumption, and indoor environmental parameters for staff and students comfort (e.g. indoor air quality, thermal comfort and lighting comfort). • Services and maintainability review during design and prior to construction stage to address the commissionability, controllability, maintainability, operability and safety of building systems and fabric design. • Owner's commitment to form a tuning team and incorporate tuning process with quarterly adjustment, measurement and review of manufacturers' warranties for nominated building systems for the first 12-month after receipt of occupancy certificate in accordance with O&M manuals and building tuning plan that was developed in accordance with approved standards and guidelines. • An Operations and Maintenance (O&M) manual will be developed for all nominated building system to provide all relevant building system and operation information to the facilities management team. • A Building User Information (BUI) in digital format will be developed and made available to relevant stakeholders and building users to provide an easy to understand guidance for efficient day-to-day use. • Owner's commitment to include as part of its policy or guideline to reduce demolition waste and extend the life of interior fitout and finishes to at least 10 years. • Separate energy sub-metering that is linked to Building Monitoring & Control System (BMCS) will be provided for areas with different usage pattern (e.g. classrooms, meeting rooms, breakout space, canteen etc)and all major item that exceeds 5% of total building energy use, or

	have rated load greater than 100kW or combined energy use of max. 10kVA. • Separate water sub-metering that is linked to Building Monitoring & Control System (BMCS) will be provided for common uses of water that consume 10% of overall water use e.g. irrigation, toilet flushing, canteen kitchens. • Contractor shall adopt formalised EMS ISO14001 certified Environmental Management Plan (EMP) or equivalent, report on all non-conformities and implement relevant corrective and preventive actions during construction. • Contractor shall carry out needs analysis and address at least three distinct physical and mental health issues for site workers by implementing programs and policies (e.g. Headspace, Beyond Blue, Mates in Construction, Nutrition Organisation) to promote and health and wellbeing on-site. • Contractor education on sustainability will be carried out during induction on-site to raise awareness among the site workers. This will include project specific targeted green star rating and pathways, the value of achieving each target, and how the site workers from each discipline can contribute to achieve the sustainability targets. • Implement recommendations as outlined in Operational Waste Management Plan (OWMP) prepared by qualified waste auditor. • Easily accessible bin center provision sized according City of Sydney Policy for Waste Minimisation or equivalent best practice guide to provide adequate space for separation and storage of at least 3 separate waste streams with clearly marked bins/ containers distributed throughout the building.
Indoor Environmental Quality	• Minimum separation distances between pollution sources and outdoor air intakes design in compliance to ASHRAE Standard 62.1:2003 to minimize entry of outdoor air pollutants. • All habitable rooms including teaching and learning spaces will be provided with fresh air provisions at a rate 50% greater than the minimum required stated in AS 1668.2-2012. CO_2 sensors shall be installed in all air conditioning ducts and habitable areas to monitor levels to ensure than rooms are well ventilated. • Owner's commitment to provide only low-emission equipment (i.e. printing/ photocopy machines and kitchen stoves) that comply with test standards ECMA-328, RAL-UZ171 or GGPS.003. • Design to maintain high level of acoustic comfort of internal ambient noise levels no higher than 5dB(A) above the lower figure in the range recommended in Table 1 of AS/NZ 2107:2016 • Provision of finishes with acoustically absorptive properties to the internal spaces to reduce the effects of noise breaking into teaching spaces and to assist in controlling reverberation. Dedicated teaching spaces must be reverberation times in the lower half of the range specified in Table 1 of AS/NZ 2107:2016. • Provision of material construction and finishes that limits noise transmission between enclosed spaces such that the sound level between enclosed spaces (e.g. classrooms to classrooms, breakout space to classrooms) is more than 75. • Flicker free lighting with minimum colour rendering index (CRI) of 80 shall be selected and installed for visual comfort • Lighting levels shall be designed to comply with best practice guidelines and light fixtures with anti-glare features (e.g. baffles, louvers, translucent diffusers to obscure direct light source from all viewing angle including upward views) shall be selected such that glare is controlled or eliminated. • Teaching and learning spaces shall be extensively daylit through the inclusion of windows and glazed sliding doors.

	• Occupants have high quality internal or external views to the surrounding landscape, which is a key factor in a building's connection to occupants' health and well-being. • Low total volatile organic compounds (TVOC) paints, adhesives, finishes and low formaldehyde engineered wood products shall be specified to provide good indoor air quality within the working and learning environment.
Energy	• The roof and ceiling design shall allow for 10% increase on the minimum required by J1.3 and J1.6. • Roof upper surface solar absorptance shall allow for at least 0.05 less than maximum allowable value in Part J1.3. • Wall-glazing construction overall u-value at least 10% less than the allowable in J1.5. • For wall exceed 80%, achieve 10% increase beyond J1.5 requirement (i.e. from R1.4 to R1.54) • LED lighting design to achieve 10% reduction in lighting power density from the maximum allowable in Table J6.2a and be linked to automatic lighting control with daylight adjustment. • Ventilation and air-conditioning systems shall be designed such that the installed fan motor power and pump power, is at least 15% and 10% respectively less than the maximum fan motor powers and pump powers defined in NCC BCA Section J Part J5. Where Section J does not apply to the equipment capacity, the minimum energy efficiency ratio (EER) for packaged air conditioning equipment shall be increased by at least 5%. • Domestic hot water powered either by renewable energy, electric heat pump with minimum COP3.5 under design conditions or waste heat recovered by other process. • Where possible, select Class A or B minimum lift energy efficiency in accordance with ISO25745-2, ISO25745-2 level 1 lift idle and standby energy performance level and ISO25745-3 class A+ to A+++ minimum escalator energy performance. • Provision of rooftop photovoltaic systems where possible for onsite renewable energy.
Transport	• Provision of at least 7.5% secure staff bicycle parking with associated staff end-of-trip facilities including shower, changing amenities with appropriate drying place and lockers to encourage active transportation and reduce carbon emissions arising from occupant travel while promoting health and fitness of commuters. • Provision of secure bicycle parking for 40% of students over grade 4. • Walkable location i.e. conveniently located within 400m to at least 8 amenities (e.g. Ck Kebab Pide Pizza & Grill, Pizza Guru, Charlanis café, Darcy Road Take Away, i-Spice Grocery Westmead, Allwell Foods Pty. Ltd., Chemsave Chemist, Westmead Private Hospital, Darcy Road Newsagency, the new Church and Education building).

<table>
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<td>Water</td>
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All sanitary fixtures shall be within one star of the WELS rating stated below:

<table>
<tr><th>Fixture / Equipment Type</th><th>WELS Rating</th></tr>
<tr><td>Taps</td><td>6 Star</td></tr>
<tr><td>Urinals</td><td>6 Star</td></tr>
<tr><td>Toilet</td><td>5 Star</td></tr>
<tr><td>Showers</td><td>3 Star (> 4.5 but <= 6.0)**</td></tr>
<tr><td>Clothes Washing Machines</td><td>5 Star</td></tr>
<tr><td>Dishwashers</td><td>6 Star</td></tr>
</table>

Provision of rainwater tank to be installed to collect and reuse rainwater within the project's site boundary.
No water-based heat rejection used on the project. Proposed air conditioning systems will utilise air-cooled outdoor condensing units
Landscaping and associated systems will be designed such that no potable water is used for irrigation, and where applicable, subsoil drip irrigation with moisture sensor override and controls shall be incorporated.
Provision of a temporary storage for 80% of the routine fire protection system test water and maintenance drain downs where possible for reuse

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<td>Materials</td>
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95% of the building's steel (by mass) is sourced from a Responsible Steel Maker and at least 60% of the fabricated structural steelwork is supplied by a steel fabricator/contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute.
95% of timber (by cost) used in building and construction will be from a reused source or certified by a forest certification scheme.
90% of PVC products used in the project including those in all formwork, pipes, flooring, blinds and cables shall meet the Best Practice Guidelines for PVC in the Built Environment, published by the Green Building Council of Australia, or no PVC products will be used;
A significant amount of construction waste going to landfill will be diverted;

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<td>Land Use & Ecology</td>
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There will be minimal negative impacts on the site's current ecological value due to retaining and reusing some of the existing buildings on site and developing over previously developed land.
At least 75% of the site area where applicable to be covered with softscape, green roof, exposed hardscape with SRI of 34 (3yr) or 39, solar panel, water body or roof with SRI 64 (over 3yr) or 84 to reduce urban heat island effect

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<td>Emissions</td>
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A gross pollutant trap (or similar) and swale landscapes will assist in the treatment of stormwater prior to discharge from the site.
Exterior and landscape lighting shall be carefully selected to ensure reduction in light pollution either by installing external light that achieve compliance with 5% upward light output ratio (ULOR) relative to its mounting orientation or by control of direct illuminance (0.1 lux to site boundary and 0.1 lux to 4.5 metres beyond the site into the night sky when calculated in accordance with AS4282:1997.

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<tr>
<td>Innovation</td>
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Improving on Green Star Benchmarks – Ultra Low VOC Paints: At least 50% (by cost) of the paints specified in the buildings shall have a maximum TVOC content of 5g/L and shall be verified by one of the approved paint

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	test methods. **Innovation Challenge – Community Benefits**: Demonstrate that needs analysis have been undertaken and how the school facilities have contributed social benefits to surrounding community. • **Innovation Challenge – Integrating Healthy Environments**: Demonstrate that needs analysis has been undertaken and how by integrating healthy environments strategy such as heathy canteen program can address the identified community and occupant health needs. • **Innovation Challenge – Financial Transparency**: Provide disclosure of financial transparency of the project. • **Innovation Challenge – Local Procurement**: A percentage of products and materials used in the building were produced or manufactured in Australia. • **Innovation Challenge – Universal Design**: Incorporate universal design based on project specific needs analysis undertaken in accordance to Design for Dignity Guidelines or equivalent. • **Global Sustainability – Green Cleaning**: Cleaning contract adopting green cleaning policy/ scope of works to all areas under building owner's control. • **Global Sustainability – Amenity Space**: Amenity space designed to comply with either 3 of the following: promote social interaction of occupants, well ventilated, good access to daylight, clear lines of sight to a high quality external view, space contain plants or is in a landscaped area and/ or noise levels that are suitable for rest or relevant work function. • **Global Sustainability – Digital Infrastructure**: Provision of FTTP or Fixed wireless connectivity with min. speed of 25-50Mbps/ 5-20Mpbs OR free WLAN at every activity centre (i.e. centre with variety use and functions) - to demonstrate significant community impact • **Global Sustainability – Groundskeeping Practices**: Employ best practice maintenance practices that significantly reduce harmful chemical use, energy use, water use, air pollution, solid waste and chemical runoff when compared with standard practices. • **Global Sustainability – Procurement & Purchasing**: Adopt a sustainable procurement policy covering at least the top 3 consumables and top 3 refurbishment materials.

Table 2: WCC Green Star Sustainability Strategy

Climate Responsive Development

SEARS Requirements

- Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:
    - Hotter days and more frequent heatwave events
    - Extended drought periods
    - Gustier wind conditions
    - More extreme rainfall events
    - How these will inform landscape design, material selection and social equity aspects (respite/shelter areas).

NSW Climate (NARCliM) Projections for 2020 – 2039 and 2060 – 2070

Climate change projections for the development has been assessed based on the NARCliM projections map for year 2020 – 2039. The following outline the climate change projections for Westmead NSW 2145 and its proposed key design respond:

Climate Parameter	Projected Change for 2020 - 2039	Key Design Initiatives
Temperature	By 2030 maximum temperatures are projected to rise by 0.7 °C and continue to rise by 1.9 °C by 2070.	The air-conditioning plant design shall cater for the temperature rise to ensure thermal comfort throughout the building operation. This allowance is also in line with HVAC lifespan of 20 – 25 years.
Heat	By 2030 Metropolitan Sydney is projected to experience an average of 4 more days above 35°C per year and continue to rise to 11 days per year by 2070.	
Rainfall	By 2030 rainfall is projected to increase by 9.7% during autumn across the region. By 2070 rainfall increases are projected for summer, autumn and most of the region during spring.	Stormwater design shall account for the increase of projected rainfall such that the post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge. Management of peak flows may include strategies such as rainwater harvesting for reuse, reduce development hardscapes and infiltration to native soils or equivalent.

Appendix A

ESD Design Principles: 4 Star Green Star Sustainability Pathway

Green Star - Design & As Built Scorecard

Project:	Westmead Catholic Community - K6	**Round:**	Please select the round of assessment
Targeted Rating:	4 Star - Best Practice		

Core Points Available	Total Score Targeted
100	47

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	
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	
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information		1	1
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance		1	1
		5.2	End of Life Waste Performance	A. Contractual Agreements	1	1

Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering		-	Complies
		6.1	Monitoring Systems		1	1
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan		-	Complies
		7.1	Environmental Management System		1	1
		7.2	High Quality Staff Support		1	1
Operational Waste	B. Prescriptive Pathway	8A	Performance Pathway: Specialist Plan		0	
		8B	Prescriptive Pathway: Facilities		1	1
Total					**14**	**10**

Indoor Environment Quality					17	
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes		1	1
		9.2	Provision of Outdoor Air	☑ A. Comparison to Industry Standards ☐ B. Performance Based Approach ☐ C. Natural Ventilation	2	1
		9.3	Exhaust or Elimination of Pollutants	☑ A. Removing the Source of Pollutants ☐ B. Exhausting the Pollutants Directly to the Outside	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	B. Sound Insulation	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	☑ A. Non Residential Spaces ☐ B. Residential Spaces	1	1
			11.1.2 Glare Reduction	☐ A. Prescriptive Method 1 ☑ B. Prescriptive Method 2 ☐ C. Performance Method		
		11.2	Surface Illuminance	☐ A. Prescriptive Method ☐ B. Performance Method ☐ C. Residential Spaces (Prescriptive Method)	1	
		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	☐ A. Fixed Shading Devices ☐ B. Blinds or Screens ☐ C. Daylight Glare Model	-	
		12.1	Daylight	☑ A. Prescriptive Methodology ☐ B. Compliance Using Daylight Factor ☐ C. Compliance Using Daylight Autonomy	2	
		12.2	Views		1	

Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	☐A. Product Certification ☐B. Laboratory Testing ☐C. No Paints, Adhesives or Sealants	1	1
			13.1.2 Carpets	☐A. Product Certification ☐B. Laboratory Testing ☐C. No Carpets		
		13.2	Engineered Wood Products	☐A. Product Certification ☐B. Laboratory Testing	1	1
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	☐A. Naturally Ventilated Spaces ☐B. Mechanically Ventilated Spaces ☐C. Residential Spaces	1	1
		14.2	Advanced Thermal Comfort	☐A. Naturally Ventilated Spaces ☐B. Mechanically Ventilated Spaces ☐C. Residential Spaces	1	
Total					**17**	**9**

Energy					**22**	
		15A.0	Conditional Requirement: Prescriptive Pathway		-	Complies
		15A.1	Building Envelope		1	1
		15A.2	Wall-Glazing Construction and Retail Display Glazing		1	1
		15A.3	Lighting		1	1
		15A.4	Ventilation and Air Conditioning		1	1
		15A.5	Domestic Hot Water		1	1
		15A.6	Transition Plan		1	
		15A.7	Fuel Switching		1	
		15A.8	On-Site Storage		1	
		15A.9	Vertical Transportation		1	1
		15A.10	Off-Site Renewables		5	

Greenhouse Gas Emissions	A. Prescriptive Pathway	15B.0	Conditional Requirement: NatHERS Pathway		-	
		15B.1	Thermal and Energy Performance		0	
		15B.2 Building Services and Appliances	15B.2.1 Lighting		0	
			15B.2.2 Ventilation and Air Conditioning	☐ Mechanically Conditioned Spaces ☐ Spaces With Mechanical Heating Only ☐ Naturally Ventilated Spaces	0	
			15B.2.3 Domestic Hot Water		0	
			15B.2.4 Appliances & Equipment		0	
			15B.2.5 Fuel Switching		0	
			15B.2.6 On-Site Storage		0	
			15B.2.7 Vertical Transportation		0	
			15B.2.8 Passive Laundry Facilities		0	
			15B.2.9 Unoccupied Areas		0	
			15B.2.10 Off-Site Renewables		0	
		15C.0	Conditional Requirement: BASIX Pathway		-	
		15C.1	BASIX Greenhouse Gas Reductions		0	
		15C.2	Off-Site Renewables		0	
		15D.0	Conditional Requirement: NABERS Pathway		-	
		15D.1	NABERS Energy Greenhouse Gas Emissions Reduction		0	
		15D.2	Off-Site Renewables		0	
		15D.3 Additional Prescriptive Measures	15D.3.1 Transition Plan		0	
			15D.3.2 Fuel Switching		0	
			15D.3.3 On-Site Storage		0	

		15E.0	Conditional Requirement: Reference Building Pathway		-	
		15E.1	GHG Emissions Reduction: Building Fabric		0	
		15E.2	GHG Emissions Reduction		0	
		15E.3	Off-Site Renewables		0	
		15E.4	District Services		0	
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan		0	
			15E.5.2 Fuel Switching		0	
			15E.5.3 On-Site Storage		0	
Peak Electricity Demand Reduction	A. Prescriptive Pathway	16A	Prescriptive Pathway: On-Site Energy Generation		1	
		16B	Modelled Performance Pathway: Reference Building		0	
Total					**11**	**6**

Transport					**10**	
Sustainable Transport	B. Prescriptive Pathway	17A	Performance Pathway		0	
		17B.1	Access by Public Transport		3	1
		17B.2	Reduced Car Parking Provision		1	
		17B.3	Low Emission Vehicle Infrastructure	A. Parking for Fuel-Efficient Vehicles	1	
		17B.4	Active Transport Facilities		1	1
		17B.5	Walkable Neighbourhoods	A. Proximity to Amenities	1	1
Total					**7**	**3**

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

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

Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	20.1.0 Responsible Steel Maker	-	Complies
				B. Energy-Reducing Processes in Steel Reinforcement Production	1	1
		20.2	Timber	☑ A. Certified Timber	1	1
				☐ B. Reused Timber		
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	B. Best Practice Guidelines for PVC	1	1
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	☐ A. Reused Products ☐ B. Recycled Content Products ☐ C. Environmental Product Declarations (EPDs) ☐ D. Third Party Certification ☐ E. Stewardship Programs	3	1
Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy	B. Disclosure Statement	-	Complies
		22A	Fixed Benchmark		0	
		22B	Percentage Benchmark		1	1
Total					**12**	**6**

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

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

Innovation					10	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process		10	
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation			
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks			2
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge			
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools.	30E	Global Sustainability			
Total					10	2

TOTALS	AVAILABLE	TARGETED
CORE POINTS	100	47.0
CATEGORY PERCENTAGE SCORE		47.0
INNOVATION POINTS	10	0.0
TOTAL SCORE TARGETED		47.0

Sydney
Level 1,
15 Atchison Street
St Leonards NSW 2065
+612 9437 1022

Melbourne
Level 3,
116 Hardware Street
Melbourne VIC 3000
+613 9111 2290

Manila
Suite 2403, Union Bank Plaza
Mercalco Avenue Ortigas Centre
Pasig City Philippines 1605

general@erbas.com.au | erbasSUSTAIN.com.au