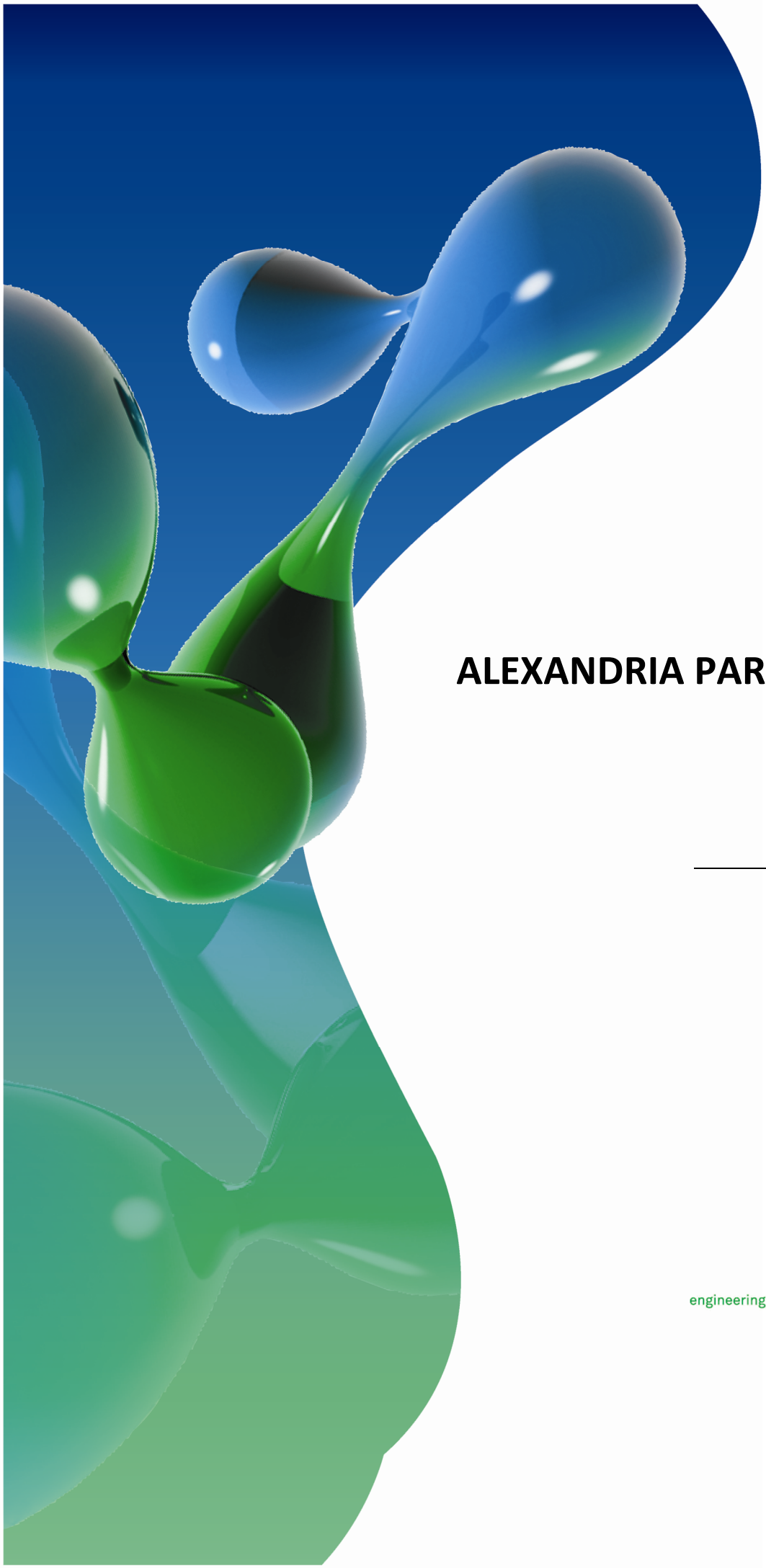

ESD REPORT

ALEXANDRIA PARK COMMUNITY SCHOOL

Alexandria, NSW

Report No: S.DOE-0102-R01

Report Date: 01/12/2017

Umow Lai

engineering sustainable environments

REPORT AUTHORISATION

PROJECT: Alexandria Park Community School

Alexandria, NSW

Date	Rev	Comment	Prepared by	Checked by	Authorised by
15/08/17	A	Draft Issue	JAD		PJ
07/09/17	B	Preliminary Issue	FE		PJ
01/12/17	C	Issue for Review	DA		PJ

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CONTENTS

1.0 INTRODUCTION

1.1 GENERAL

This ESD Report has been prepared by Umow Lai on behalf of the New South Wales Department of Education (the 'Applicant'). It accompanies an Environmental Impact Statement (EIS) prepared in support of State Significant Development Application SSD 17_8373 for the redevelopment of 'Alexandria Park Community School' at 7-11 Park Road, Alexandria (the 'Site'). The EIS seeks development consent for the following works:

The redevelopment of the Alexandria Park Community School ('the School') will address issues of capacity for schools in the inner city areas of Sydney and is also driven by the population growth resulting from the large number of residential developments that are transforming the former industrial precincts of Zetland, Waterloo and Alexandria.

The new school has been briefed to accommodate up to 1,000 primary school students and up to 1,200 secondary school students on one campus in an integrated and fully connected school building.

Specifically, this project includes:

- Demolition of all existing buildings on-site, including the temporary pop-up schools;
- Remediation of specific areas of the site containing contaminated fill;
- Construction of multiple school buildings of up to five stories, arranged along the western and southern parts of the site comprising:
    - Classroom home bases;
    - Collaborative learning spaces;
    - Specialist learning hubs;
    - Learning support spaces;
    - Offices for teachers and administrative staff;
    - Library; and
    - Student canteen.
- Construction of a sports hall and multiple outdoor sports courts;
- An all-weather multipurpose synthetic sports field;
- Informal play spaces and Covered Outdoor Learning Space or COLA;
- A community centre;
- A pre-school for 39 children;
- Site landscaping including green links, community garden and open space;
- Construction of a new on-site car park and associated vehicular access point off Belmont Street; and
- Augmentation and construction of ancillary infrastructure and utilities as required.

Delivery of the project will be undertaken in sequential phases to maintain an operational school on the Park Road Campus and will involve enabling works separate to this application followed by three main construction phases for the new building and external works.

The purpose of this report is to provide an assessment of the proposal as described above and detailed within the EIS.

Specifically, this ESD Report will outline the measures that are proposed to be implemented to minimise consumption of resources, energy and water, and to demonstrate that the project has been assessed against a suitable accredited rating framework.

The sustainability initiatives proposed for the development including water and energy efficiency initiatives are in addition to the minimum compliance requirements of the BCA (i.e. Section J).

As a result of the sustainability initiatives discussed within this report, the Alexandria Park Community School development is expected to achieve a high level of environmental sustainability.

1.2 PROJECT DESCRIPTION

The site is located within the Alexandria Local Government Area. The proposed redevelopment works consist of upgrading the school facilities with major redevelopments to the site, including demolishing all permanent and temporary school buildings currently on site, and construction of new school buildings and facilities within the site. Landscaping and pedestrian improvements throughout the site are also included, such as new outdoor learning areas and play areas within the site.

The School will contain high quality classrooms, collaborative learning spaces, open play spaces and associated facilities including a gymnasium with a sports court and stage, as well as a library and canteen.

1.3 REFERENCED STANDARDS

This report has been undertaken with reference to the following:

- Clause 7(4) Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulations)
- Green Building Council of Australia, Green Star Design & As-Built v1.1 Rating Tool
- NCC 2016 Building Code of Australia – Volume 1

1.4 SOURCE DOCUMENTATION

Table 1 outlines a summary of the documentation used as the basis of this compliance analysis. Inputs in this report have been coordinated with all relevant consultants.

Discipline	Documentation Type	Issue	Date	Custodian
Architectural	Architectural Drawings	Issue for Information	24 July 2017	TKD Architects
Environmental	Detailed Site Investigation	R01-Rev1	9 May 2017	Coffey

Table 1 *Summary of basis documentation*

1.5 LIMITATIONS OF THIS REPORT

Due care and skill has been exercised in the preparation of this report.

The purpose of this ESD Report is to outline the measures that are proposed to be implemented to minimise consumption of resources, energy and water, and to demonstrate that the project has been assessed against a suitable accredited rating scheme, as detailed within the EIS. It should be read in conjunction with the current project documentation and specific applications may vary during the design development of the project.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Umow Lai for detailed advice which will take into account that party's particular requirements.

2.0 SCHEDULE 2 OF EP&A REGULATION 2000

The followings section details how the proposed Alexandria Park Public School incorporates the principles of ecologically sustainable development (ESD) in accordance with Schedule 2 Clause 7(4) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

2.1 THE PRECAUTIONARY PRINCIPLE

Per Schedule 2 Clause 7(4) of the EP & A Regulation:

*(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.

2.1.1 PROJECT RESPONSE

The precautionary principle has been adopted and all potential impacts have been considered and mitigated where a risk is present, as outlined in supporting environmental and ecological assessments and conclusions.

The built form embraces sustainability principles as it has been designed and arranged to maximise the passive (i.e. energy free) performance of the building by introducing abundant natural daylight and harnessing natural ventilation.

Roof form has been arranged to maximise the platform for future photovoltaics, and design development will explore the feasibility for all rainwater from new roofs is to be captured and re-used for toilet flushing, irrigation and wash down.

Building services, lighting and equipment will be specified to be highly energy efficient using current best practice approaches and products.

Whilst a comprehensive climate risk assessment has not been carried out on this site, the future climate-driven risks relating to this site have been considered, with the highest risks being flooding and an increase in maximum temperatures and the length and frequency of heat events.

In relation to predicted increases in temperatures, the current concept design pays particular attention to addressing high external heat loads by providing substantial roof overhangs and shading. Design development will further explore options for high-performance glazing and internal thermal mass.

Therefore the design directly addresses Greenhouse Gas Emissions (GHG Emissions) and their impact on climate change.

2.2 INTER-GENERATIONAL EQUITY

Per Schedule 2 Clause 7(4) of the EP & A Regulation:

*(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.*

2.2.1 PROJECT RESPONSE

The concept design has embraced Indoor Environmental Quality as a fundamental requirement by focussing on delivering abundant fresh air, optimum thermal comfort, quality acoustics, and low toxicity materials and finishes.

The proposed site conditions in combination with the proposed landscape design will result in the project actively engaging its occupants with their surroundings, considered a key factor in the link between building design and occupant wellbeing – commonly referred to as our 'biophilic response'.

The extensive harnessing of daylight will also have a measurable reduction in energy consumption and associated GHG Emissions by reducing demand for artificial lighting. GHG Emissions are a known key contributor to human-caused climate change, considered one of the most critical inter-generational issue of our time.

2.3 CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

Per Schedule 2 Clause 7(4) of the EP & A Regulation:

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

2.3.1 PROJECT RESPONSE

Whilst the proposed works have minimal impact on existing vegetation and biological communities on the site, proposed works include re-instating additional site vegetation. The landscape design is currently considering a range of biodiversity enhancements on site, including additional plantings and outdoor learning spaces.

Refer to the supporting environmental and ecological assessments for information relating to the significant ecology, biological diversity and ecological integrity of the site. Refer to the landscape architectural package for more information on proposed landscape.

2.4 IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

Per Schedule 2 Clause 7(4) of the EP & A Regulation:

*(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.

2.4.1 PROJECT RESPONSE

The environmental targets for the project have largely been embedded in the nature of the development rather than as additional 'add-on' items. For example, the floor plate design for the buildings simultaneously responds to the site's contours – thus minimising earth works and embodied energy in the structure, and the narrow floor plate also allows excellent distribution of daylight and ventilation into learning and teaching spaces – reducing ongoing operating costs for the school.

The narrow floor plates are also arranged to facilitate very effective natural cross ventilation, further reducing operation costs for the school.

3.0 RATING SCHEME EQUIVALENCE - GREEN STAR

Green Star has been selected by the project team as a framework for the proposal's sustainability attributes. Green Star is a comprehensive environmental rating system for buildings. Green Star separately evaluates the environmental initiatives of design, projects and/or buildings based on a number of criteria, including energy and water efficiency, indoor environmental quality and resource conservations.

The proposal's informal (i.e. not formally certified by the Green Building Council of Australia, the administrators for Green Star) rating achieves at least a 4 Star Best Practice outcome.

The Green Star environmental rating system for buildings was created for the property industry in order to:

- Establish a common language;
- Set a standard of measurement for green buildings;
- Promote integrated, whole-building design;
- Recognise environmental leadership;
- Identify building life-cycle impacts; and
- Raise awareness of green building benefits.

3.1 GREEN STAR CATEGORIES

The Green Star rating systems is made up of the following environmental categories:

- Management
- Indoor Environmental Quality
- Energy
- Transport
- Water
- Materials
- Land Use and Ecology
- Emissions
- Innovation

The categories are then divided into individual credits, each of which addresses an initiative that improves or has the potential to improve, a design, project or building's environmental performance. Points are awarded in each credit for actions that demonstrate the project has met the overall objectives or Green Star and the specific aims of the rating tool.

In establishing the project's level of alignment with the Green Star rating tool 'scorecard', several assumptions must be made relating to how the future school will be managed and operated. Given that Green Star rewards projects not only for built works but also for how the completed building is operated, it is necessary during design phases to assume a minimum or best practice level of operational performance. The assumptions made within are considered 'typical' for new buildings and will without exception contribute to better environmental and financial performance of the completed school.

3.1.1 MANAGEMENT

The management category encourages and rewards the adoption of practices and processes that enable and support best practice sustainability outcomes throughout the different phases of a project's design, construction and its ongoing operation. The management category recognises the projects who improve a projects' sustainability performance by influencing areas where decision-making is critical, rewarding the implementation of processes and strategies that support positive sustainability outcomes during construction. The category also promotes practices that ensure a project will be used to its optimum operational potential.

The Project will include the following initiatives;

1. The School will establish ongoing environmental performance targets relating to its consumption of energy and water, production and recycling of waste, and to the ongoing maintenance and improvement of good indoor environmental quality.
2. During Tender documentation and documentation for construction, the design will be reviewed for its ease of maintenance for all building services and building fabric.
3. Building services will be fine-tuned during the first 12 months of operation, covering all four seasons, and providing monthly reviews, quarterly tuning and a final re-commissioning after 12 months. The purpose of this process is to tune the buildings to suit the way they are being used.
4. Comprehensive pre-commissioning and commissioning activities will be performed for all nominated building systems.
5. Building user guides will be produced to help users interact effectively with the buildings, optimising building performance and user comfort. The Guides will include guidance on all sustainability attributes of the site, e.g. cyclist facilities, public transport, waste recycling etc., and also information on maintenance requirements;
6. Building services will include metering on all major energy and water-consuming equipment, providing the facility manager with live information on system performance and allowing them to closely manage efficient use of resources on site;
7. The proposal includes facilities for the separation and recycling of waste streams.

3.1.2 INDOOR ENVIRONMENTAL QUALITY

The Indoor Environment Quality category aims to encourage and reward initiatives that enhance the comfort and well-being of occupants. The credits within this category address issues such as air quality, thermal comfort and acoustic comfort. This category rewards projects that achieve sustainability performance improvements in a manner that also improves occupants' experience of the space. The 'Indoor Environment Quality' category recognises that buildings are designed for people and that reductions in energy use should never be made at the expense of the occupants' health and wellbeing.

The Project will include the following initiatives;

1. All habitable rooms including teaching and learning spaces will be naturally ventilated in accordance with AS 1668.4-2012. It is noted that the project will likely exceed these requirements to ensure an effective natural ventilation strategy.

2. Indoor noise levels will provide a high level of acoustic comfort, with internal noise levels being no higher than 5db(A) above the 'satisfactory' sound levels in Table 1 of AS/NZS 2107:2000;
3. The project will address noise transmission in enclosed spaces through acoustic separation, whereby fixed solid partitions between teaching spaces or private offices will be constructed to achieve a weighted sound reduction index of at least 45;
4. Light fittings shall be selected, where possible, such that glare is controlled or reduced and occupants will have the ability to control lighting in the spaces through manual lighting controls;
5. Teaching and learning spaces are also extensively daylit through the inclusion of windows in all teaching and learning spaces, delivering high quality daylight;
6. Occupants have extensive views to the surrounding landscape, a key factor in a building's connection to occupants' health and wellbeing;
7. All paints, sealants, adhesives, floor coverings and composite timbers used internally will meet low VOC (Volatile Organic Compound) emissions limits in accordance with Green Star Design and As-Built v1.1 VOC Emissions limits tables.

3.1.3 ENERGY

The Energy category aims to reward projects that are designed and constructed to reduce their overall operational energy consumption below that of a comparable standard-practice building. Such reductions are directly related to reduced greenhouse gas emissions, lower overall energy demand as well as reductions in operating costs for building owners and occupants. The Energy category rewards projects that facilitate reductions in greenhouse gas emissions through energy efficient design and encouraging the utilisation of energy generated by low-emission sources.

The Project will include the following initiatives;

1. The building envelope will exceed NCC BCA Section J Parts J1 Building Fabric and J2 Glazing by at least 15% as demonstrated through the DTS or JV3 pathway;
2. A high percentage of lighting will be controlled either through occupant detection, daylight controls, the period bell system or time clock controlled to meet BCA Section J6 requirements;
3. All habitable rooms will be naturally ventilated where possible;
4. The domestic hot water system (DHW) will be low–emission, utilising one or any combination of the following technologies (to be selected during detailed design):
    a. Natural gas with solar pre-heat
    b. Waste heat (e.g. from cogeneration or other processes)
    c. Heat-pump technology (with COP of not less than 3.5). Heat-pumps utilising natural refrigerants (e.g. CO_2) will be preferenced over those using conventional refrigerants.
5. The project will include solar photovoltaic (PV) arrays to supplement energy consumption and reduce ongoing operating costs.

3.1.4 TRANSPORT

The Transport category aims to reward projects that facilitate a reduction of the dependency on private car use and promote the use of healthy means of transport as an important means of reducing overall greenhouse gas emissions.

If reliance on individual motor vehicle transportation is to be reduced, it is necessary to maximise alternative transportation options. Rather than limiting access to private fossil fuel vehicles, the Transport category aims to encourage and reward initiatives that reduce the need for their use. This may include initiatives that encourage and make possible the use of mass transport options, cycling or walking, and the selection of sites that are close to a large number of amenities.

The Project will include the following initiatives;

1. The proposal includes cyclist facilities for students and staff;
2. The site is highly accessible by various modes of public transport including trains and buses. It is also in close proximity to a number of community services.

3.1.5 WATER

The Water category aims to encourage and reward initiatives that reduce the consumption of potable water through measures such as the incorporation of water efficient fixtures and building systems and water re-use.

Reductions in operational water consumption may be achieved through maximisation of water efficiency within a project, as well as through the utilisation of reclaimed water sources.

The Project will include the following initiatives;

1. The proposal includes rainwater harvest and re-use;
2. All bathroom fixtures (toilet pans, urinals, hand basin taps and showers) will meet minimum WELS ratings in accordance with the most recent EFSG Design Guidelines, e.g.,
    a. Basin taps and urinals to be equal to or more than 5 Star WELS
    b. Showers to be equal to or more than 3 Star WELS
    c. Toilets to be equal to or more than 4 Star WELS
3. Areas with mass planting will be irrigated using sub-soil drippers and soil moisture sensors to limit unnecessary irrigation, or no potable water will be used for irrigation.

3.1.6 MATERIALS

The Materials category aims to address the consumption of resources within a building construction context, by encouraging the selection of lower-impact materials. The category also encourages absolute reductions in the amount of waste generated or the recycling of as much of the waste generated as possible.

The Project will include the following initiatives;

1. A high percentage 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;

2. A high percentage of timber used in building and construction will be from a reused source or certified by a forest certification scheme;
3. A significant amount of construction waste going to landfill will be diverted.

3.1.7 LAND USE AND ECOLOGY

The Land Use & Ecology category aims to reduce the negative impacts on sites' ecological value as a result of urban development and reward projects that minimise harm and enhance the quality of local ecology.

The Project addresses this category through the following;

1. 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;
2. Current landscape will be improved through the addition of new landscaped vegetation;
3. Rooftops will contribute to a cooler microclimate through the use of light coloured materials – known as reducing the Heat Island Effect.

3.1.8 EMISSIONS

The Emissions category aims to assess the environmental impacts of 'point source' pollution generated by projects. Negative impacts commonly associated with buildings include damage to the environment through refrigerant leaks or disturbances to native animals and their migratory patterns as a result of light pollution.

The Project will include the following initiatives;

1. Exterior and landscape lighting shall be carefully selected to ensure there has been a reduction in light pollution through either the control of upward light output ratio (ULOR) or control of direct illuminance.
2. A gross pollutant trap (or similar) and swale landscapes will assist in the treatment of stormwater prior to discharge from the site.

3.1.9 INNOVATION

The Innovation category is a way of encouraging, recognising, and rewarding the spread of innovative practices, processes and strategies that promote sustainable communities and cities.

The Innovation category acknowledges efforts which demonstrate that sustainable development principles have been incorporated not only for the community for which the Green Star criteria apply, but in also in a broader sense. This may include collaboration between developers and other parties, and is recognised separately from any outcomes rewarded in other categories.

At this early stage of the project the details of potential Innovations have not yet been developed, which typically require extensive input from the final facility operators, managers and users.

4.0 RESOURCES, ENERGY AND WATER

As described in the previous sections, the project has adopted multiple initiatives that combine to reduce the consumption of resources, energy and water during construction and operation, and also to support the adoption of more sustainable resources.

4.1 RESOURCES

- The proposal aims to minimise the consumption of resources required for construction by a high percentage of timber, formwork, pipes, flooring, blinds and cables used in the project will be responsibly sourced or have a sustainable supply chain.

4.2 ENERGY

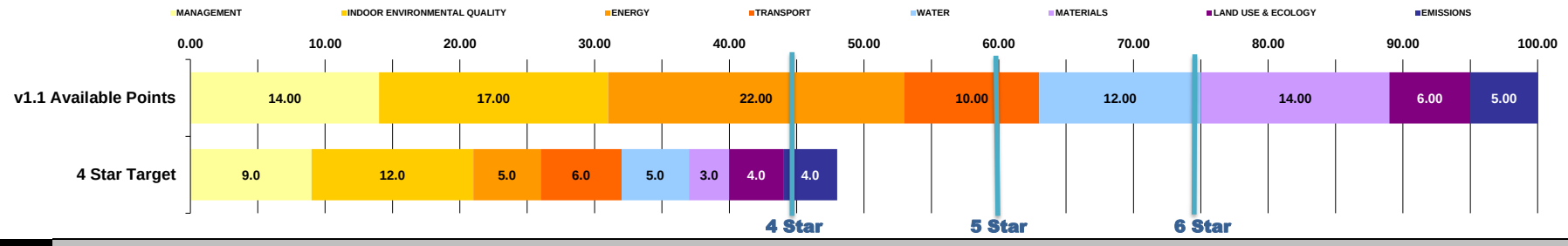
- The narrow floor plates of the proposal are ideally laid out to permit extensive high quality daylight, leading to superior learning and teaching space amenity and can lead to reduced energy consumption for lighting. The narrow floor plates also facilitate effective natural cross ventilation, further contributing to reduced energy consumption and costs.
- The proposal also includes PV arrays to further reduce ongoing energy costs for the school.

4.3 WATER

- The proposal includes rainwater tanks and re-use of rainwater for irrigating mass-planted areas of landscape.
- The proposed landscape will be low water demand, and any irrigation will be via sub-soil drip irrigation in order to further minimise water consumption and costs.

5.0 APPENDIX A – GREEN STAR PATHWAY

ALEXANDRIA PARK COMMUNITY SCHOOL: GREEN STAR PATHWAY



New South Wales	Green Star Design & As-Built Credit	v1.1 Available Points	4 Star Target	Additional credits under consideration	Compliance Requirements
MANAGEMENT		**14%**			
1.0	Green Star Accredited Professional	1	1	-	A Green Star Accredited Professional (GSAP) to be included on the project. Umow Lai are providing GSAP role.
2.0	Environmental Performance Targets	-	Complies	-	Targets for energy and water consumption to be set and documented. E.g. 25% improvement on min DTS Energy Performance. 50% potable water reduction than typical school building.
2.1	Services and Maintainability Review	1	1	-	School Facilities Management staff to review design during design stage and prior to construction. FM to consider commissionability, controlability, maintanability, fit for purpose and safety.
2.2	Building Commissioning	1	1	-	Pre-commissioning & commissioning must be undertaken to CIBSE, ASHRAE and/or AIRAH standards/guidelines.
2.3	Building Systems Tuning	1	1	-	12 month building tuning period is required with quarterly reviews and tuning, including analysis of data from monitoring systems and assessment of feedback from occupants.
2.4	Independent Commissioning Agent	1		-	Not Claimed. Requires engagement of specialist consultant to advise, monitor and verify the commissioning and tuning of building during all stages of project. Must be appointed from design stage.
3.1	Implementation of a Climate Adaptation Plan	2		-	Not Claimed. Requires engagement of specialist consultant to identify climate change related risks with specific design responses.
4.1	Building Operations and Maintenance Information	1		-	Not Claimed. Requires generation of Operations and Maintenance Information package and a Building Log Book. Intent to provide central point of information for those managing the facility.
4.2	Building User Information	1	1	-	Development of Building User Information guide to be included in Head Contractor scope. Involves developing package for occupants about building functions, initiatives to enhance energy efficiency etc.
5.1	Environmental Building Performance	1	1	-	School's commitment to set, measure and report on Environmental Performance targets set through Credit 2.0.
5.2	End of Life Waste Performance	1		-	Not Claimed. Requires School's commitment to reduce demolition waste at the end of life of an interior fitout or base building component.
6.0	Metering	-	Complies	-	Accessible metering to be provided to monitor building energy and water consumption.
6.1	Monitoring Systems	1	1	-	Requires strategy for how to monitor and use data from collected from BMS. Cloud based technology is proposed to clearly present data consumption trends.
7.0	Environmental Management Plan	-	Complies	-	A comprehensive project-specific Environmental Management Plan (EMP) must be in place for consutruction. To be included in Head contractor clauses/specification.
7.1	Formalised Environmental Management System	1	1	-	Formalised, systematic and methodical approach to planning, implementing and auditing the EMP to ensure conformance to EMP. To be included in Head contractor clauses/specification.
8B	Operational Waste	1	1	-	Requires on-site waste recycling system. Facilities must be accessible.
	Category Total	**14**	**9**		
INDOOR ENVIRONMENTAL QUALITY		**17%**			
9.1	Ventilation System Attribiutes	1		-	Not applicable to naturally ventilated space with hydronic heating
9.2	Provision of Outdoor Air	2	2	-	2 points awarded for naturally ventilated spaces which meet AS 1668.4-2012
9.3	Exhaust or Elimination of Pollutants	1	1	-	Exhausting pollutants from print/photocopy equipment, cooking equipment, and carpark vehicle exhaust through dedicated exhaust systems. Print/photocopy must be isolated in enclosed spaces.
10.1	Internal Noise Levels	1	1	-	Acoustic Consultant to confirm. Internal ambient noise levels no more than 5dB(A) above the statisfactory levels provided in Table 1 AS/NZS 2107:2000.
10.2	Reverberation	1		-	Not Claimed. Dedicated teaching space must have reverberation times in lower half of range specified in Table 1 of AS/NZS 2107:2000. All other spaces to not exceed maximum limit.
10.3	Acuostic Separation	1	1	-	Acoustic Consultant to confirm. Partition between spaces should achieve a weighted sound reduction index (Rw) of at least 45.
11.0	Minimum Lighting Comfort	-	Complies	-	UL Electrical Engineers have confirmed. Lights to be flicker free and address perception of colour in the space.
11.1	General Illuminance and Glare Reduction	1	1	-	UL Electrical Engineers have confirmed. Lighting levels will comply with best practice guidelines (AS 1680.2.4) and glare is eliminated.
11.2	Surface Illuminance	1		-	Not Claimed. Requires additional lighting calculations to show lighting and surfaces improve uniformity of lighting and give visual interest.
11.3	Localised Lighting Control	1	1	-	UL Electrical Engineers have confirmed. Occupants have the ability to control the lighting in their immediate environment.
12.0	Glare Reduction	-	Complies	-	Architects to confirm glare is reduced through a combination of blinds, screens, fixed shading devices or other means.
12.1	Daylight	2	2	-	Requires space to achieve good levels of daylight. Intent met based on Umow Lai professional opinion (not engaged for modelling).
12.2	Views	1	1	-	60% of total area has a clear line of site to a high quality internal or external view. Intent met based on Umow Lai professional opinion (not engaged for calculations)
13.1	Paints, Adhesives, Sealants and Carpets	1	1	-	Internally applied paints, adhesives, sealants and carpets meet stipulated Total VOC Limits. Refer to Green Star Design and As-Built guidelines for limits.
13.2	Engineered Wood Products	1	1	-	All engineered wood products meet stipulated formaldehyde limits or no new engineered wood products are used in the building. Refer to Green Star Design and As-Built guidelines for limits. Includes particleboard, plywood, fibreboard etc.
14.1	Thermal Comfort	1		-	Not Claimed. Likely achieved but requires modelling to prove (Umow Lai not engaged).
14.2	Advanced Thermal Comfort	1		-	Not Claimed. Requires modelling to prove (Umow Lai not engaged).
	Category Total	**17**	**12**		
ENERGY		**22%**			
15A.0	Conditional Requirement	-	Complies	-	Requires minimum Deemed-to-Satisfy (DTS) requirements of Parts J1 (building fabric) and J2 (glazing) of Section J to be exceeded by 5%.
15A.1	Building Envelope	1	1	-	Nominal increase of 15% over Section J minimum R-Value requirements for building fabric.
15A.2	Glazing	1	1	-	Requires 15% improvement on minimum Section J Glazing U-Value and SHGC requirements.
15A.3	Lighting	1	1	-	UL Electrical Engineers have confirmed lighting power density is 30% less than maximum allowed in Section J. Automated lighting control systems (occupant detection, daylight, time switches) provided.
15A.4	Ventilation and Air Conditioning	1	1	-	Confirmed by Umow Lai Mechanical. The space is naturally ventilated or 15% improvement on Section J efficiency requirements for fan, pump, water heater and air conditioning equipment.
15A.5	Domestic Hot Water	1	1	-	Domestic Hot Water to be powered by electric heat pump. Can be powered by natural gas but this is least preferrable option.
15A.6	Building Sealing	1		-	Not Claimed. Requires a pressurised building air leakage test to be carried out on the completed building.
15A.7	Accredited GreenPower	2		-	Not Claimed. Achievable but requires ongoing purchase of green power energy premium.
16A	Peak Electricity Demand Reduction - On-Site Energy Generation	1		-	Not Claimed. Requires on-site electricity generation to reduce total peak electricity demand by 15%. Requires calculations.
	Category Total	**9**	**5**		

ALEXANDRIA PARK COMMUNITY SCHOOL: GREEN STAR PATHWAY

New South Wales	Green Star Design & As-Built Credit	v1.1 Available Points	4 Star Target	Additional credits under consideration	Compliance Requirements
TRANSPORT		**10%**			
17B.1	Access by Public Transport	3	3	-	Based on accessibility of the site by public transport.
17B.2	Reduced car Parking Provision	1	1	-	Based on minimal on-site car parking
17B.3	Low Emisson Vehicle Infrastructure	1		-	Not Claimed. Requires provision of electric vehicle charging infrastructure and/or dedicated car share spaces.
17B.4	Active Transport Facilities	1	1	-	Requires bicycle parking, access to showers and lockers on site for occupants
17B.5	Walkable Neighbourhoods	1	1	-	Site achieves walk score of approx 92. (Minimum required is 80).
	Category Total	7	**6**		
WATER		**12%**			
18B.1	Sanitary Fixture Efficiency	1	1	-	Fixtures to meet minimum WELS ratings: taps (6 *), urinals (6 *), toilets (5 *), showers (3 *), clothes washing machines (5 *) and dishwashers (6 *)
18B.2	Rainwater Reuse	1	1	-	Civil to confirm. Rainwater tank is installed to collect and reuse rainwater.
18B.3	Heat Rejection	2	2	-	Based on Mechanical system whereby no water based heat rejection system is used.
18B.4	Landscape Irrigation	1	1	-	Landscape Architect to confirm. Either drip irrigation with moisture sensor override is installed, or no potable water is used for irrigation.
18B.5	Fire System Test Water	1		-	Not Claimed. Requires fire protection system to not expel water for testing, or storage tank for fire system test water so water can be reused.
	Category Total	6	**5**		
MATERIALS		**14%**			
20.1	Structural and Reinforcing Steel	1		-	Not Claimed.
20.2	Timber Products	1	1	-	Structural Engineer to confirm. Requires timber used in building and construction to be from a reused source or certified by a forest certification scheme. To be included in Specification.
20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1	-	Structural Engineer to confirm. Requires materials to have no PVC and have an Environmental Product Declaration, or PVC to meet bet practice guidelines for PVC.
20.1	Product Transparency and Sustainability	3		-	Not Claimed. Can be achieved if a specified percentage (3%, 6% or 9%) of products are reused, recycled, have environmental product declarations, are third-party certification or stewardship programs.
22B	Construction and Demolition Waste	1	1	-	To be included in head contractor clause and tendering documents. Requires reducing construction waste going to landfill by reusing or recycling 90% of the waste generated during construction.
	Category Total	7	**3**		
LAND USE & ECOLOGY		**6%**			
23.0	Endangered, Threatened or Vulnerable Species	-	Complies	-	
23.1	Ecological Value	3	1	-	Default. Based on ecological value of site being improved by project (e.g. Inclusion of Landscaping).
24.0	Sustainable Site	-	Complies	-	Development not located on old growth forest or wetland.
24.1	Reuse of Land	1	1	-	Given based on site located on previously developed land.
24.2	Contamination and Hazardous Materials	1	1	-	Achieved as hazardous materials study has been carried out and hazardous materials on site will be stabilised.
25.0	Heat Island Effect Reduction	1	1	-	Architect to confirm all roofing and hardscape material SRI values are >82
	Category Total	6	**4**		
EMISSIONS		**5%**			
26.1	Stormwater: Reduced Peak Discharge	1	1	-	Civil Engineer to confirm. Post-development peak event discharge from site does not exceed the pre-development peak event discharge.
26.2	Stormwater: Reduced Pollution Targets	1	1	-	Civil Engineer to confirm. All stormwater from the site meets specified Pollution Reduction Targets. Refer to Green Star Design and As-Built guidelines for limits.
27.0	Light Pollution to Neighbouring Bodies	-	Complies	-	UL Electrical Engineers have confirmed. Project to comply with AS 4282:1997 Control of the Obtrusive Effects of Outdoor Lighting
27.1	Light Pollution to Night Sky	1	1	-	UL Electrical Engineers have confirmed. It can be demonstrated that a specified reduction in light pollution has been achieved.
28.0	Legionella Impacts From Cooling Systems	1	1	-	Based on Mechanical system whereby no water based heat rejection system is used.
29.0	Refrigerants Impacts	1		-	Reduce sewer discharge through low water use in conjunction with water reuse. Provision of high-efficiency clothes washers could earn one point (if 5 Star WELS). Greywater system required for further points (up to 2pts)
	Category Total	5	**4**		
INNOVATION					
30A	Innovative Technology or Process			-	
30B	Market Transformation			-	
30C	Improving on Green Star Benchmarks			-	
30D	Innovation Challenge	10	1	-	Energy Metering Integrity. Metering network to be validated in accordance with NABERS and/or NMI standards. All meter functionality correctly calibrated at practical completion. Metering network continually and automatically monitored. Clauses to be included in relevant Specifications.
30E	Global Sustainability			-	
	Category Total	10	**1**		
TOTAL	**Weighted total**	100	**49.0**		