Royal Prince Alfred Hospital Redevelopment

Camperdown NSW 2050

SSDA Report - Sustainability

To Support the RPA Redevelopment Project

28th October 22

Report prepared for Health Infrastructure NSW
by Climatewise Design ABN: 98 775 368 802

CLIMATEWISE
DESIGN

Report Summary

Revision:	**04**	**Date:**	31/10/22
Author:	Digby Hall		
Checked By:	-		
Revision	**Description**		**Issue Date**
01	Issued to support SSDA		20/7/21
02	Updated for review		8/9/22
03	Final for SSDA		30/9/22
04	Site details updated		31/10/22
Project Status:	Part 3 Schematic Design		

Project	
Project Name:	Royal Prince Alfred (RPA) Hospital Redevelopment
Building Owner	Health Infrastructure NSW / Sydney Local Health District
Head Contractor:	TBC
Client	Health Infrastructure NSW
Sustainability Certifications Required	
• HI NSW DGN 058: NCC 2019 Section J +10%, and equivalent to 5 Star Green Star (Design & As-Built v1.3)	

Climatewise Design

ABN 98 775 368 802 (Digby Charles Hall trading as Climatewise Design)

52C Palmer St., Cammeray (Cammeraygal Land), NSW 2062
0404 025 747 | digbyhall@climatewisedesign.com | www.climatewisedesign.com

Contents

1. Introduction 4
Project background ..... **Error! Bookmark not defined.**
Sustainability 5
2. Targets & Benchmarks 6
3. Response to SEARs 7
4. Conclusion 13

1. Introduction

Site description

The Royal Prince Alfred (RPA) Hospital campus is located in Sydney's inner west suburb of Camperdown, within the City of Sydney Local Government Area. The campus is situated between the University of Sydney to the east and the residential area of Camperdown to the west. A north-south arterial road (Missenden Road) divides the campus into two distinct portions, known as the East and West Campuses. The northern boundary of the campus is defined by the Queen Elizabeth II Rehabilitation Centre and the southern extent of the campus is defined by Carillon Avenue.

The works are proposed to both the East and West Campuses, as well as some off-site works occurring within the University of Sydney. The site comprises the following land titles:

East campus:

– Lot 1000 DP 1159799 (12 Missenden Road, Camperdown, 2050).

West campus:

– Lot 11 DP 809663 (114 Church Street, Camperdown, 2050); and

– Lot 101 DP 1179349 (68-81 Missenden Road, Camperdown 2050).

Off-site works are proposed on University of Sydney land, known as Lot 1 DP 1171804 (3 Parramatta Road, Camperdown, 2050) and Lot 1001 DP 1159799 (12A Missenden Road, Camperdown, 2050).

Project background

In March 2019, the NSW Government announced a significant $750 million investment for the redevelopment and refurbishment of the RPA Hospital campus. The Project will include the development of clinical and non-clinical services infrastructure to expand, integrate, transform and optimise current capacity within the hospital to provide contemporary patient centred care, including expanded and enhanced facilities.

The last major redevelopment of RPA Hospital was undertaken from 1998 to 2004 projected to 2006 service needs. Since then, significant growth has been experienced in the volume and complexity of patients, requiring significant investment to address projected shortfalls in capacity and to update existing services to align with leading models of care.

The redevelopment of RPA Hospital has been the top priority for the Sydney Local Health District since 2017 through the Asset Strategic Planning process, to achieve NSW Health strategic direction to develop a future focused, adaptive, resilient and sustainable health system.

Description of development

Alterations and additions to the RPA Hospital East Campus, comprising:

- Eastern wing: A new fifteen (15) storey building with clinical space for Inpatient Units (IPU's), Medical Imaging, Delivery, Neonatal and Women's Health Services, connecting to the existing hospital building and a rooftop helicopter landing site (HLS);
- Eastern extension: A three (3) storey extension to the east the existing clinical services building to accommodate new operating theatres and associated plant areas;
- Northern expansion: A two (2) storey vertical expansion over RPA Building 89 accommodating a new Intensive Care Unit and connected with the Eastern Wing;
- Internal refurbishment: Major internal refurbishment to existing services including Emergency Department and Imaging, circulation and support spaces;
- Enhanced Northern Entry/ Arrival including improved pedestrian access and public amenity;
- Demolition of affected buildings, structures and trees;
- Changes to internal road alignments and paving treatments; and
- Landscaping works, including tree removal, tree pruning, and compensatory tree planting including off-site on University of Sydney land.

Ancillary works to the RPA Hospital West Campus, comprising:

- Temporary helicopter landing site above existing multi storey carpark;
- Re-routing of existing services; and
- Associated tree removal along Grose Street.

Sustainability

This report describes the RPA Redevelopment project's compliance with the SEARs Section 9 *Ecologically Sustainable Development* requirements (project specific SEARs dated 29/8/22). The project has established the following goals;

- A minimum 10% improvement in energy efficiency compared to a baseline of National Construction Code (NCC) Section J (NCC 2019 assumed);
- A minimum of 60 points (5 Stars) under the HI ESD Framework (Appendix C to Design Guide Note 058); and
- Carbon Neutral by 2030, meaning Net Zero for all of Sydney Local Health District's (SLHD) operations under the Climate Active Standard for Organisations.

The project is meeting or exceeding all parts of Section 9, as follows;

Table 1 SEARs Section 9 Compliance Summary

SEARs Section 9 Requirement	RPA Response
Identify how ESD principles (as defined in clause 7(4) of the Schedule 2 of the EP&A Regulation are incorporated in the design and ongoing operation of the development	A range of initiatives that are being developed by the project to meet and often exceed the requirements laid out in clause 7(4), including the adoption of a carbon neutral target, and close alignment with Green Star Design & As-Built (v1.3), the principles of which are laid out in HI's DGN-058 ESD Evaluation Tool
Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	The project is benchmarking against 60 points using HI's DGN-058 ESD Evaluation Tool which references the industry-recognised *Green Star Design & As-Built v1.3* rating tool. DGN-058 has used this Green Star rating tool as a reference and carried out further tailoring specific to the healthcare setting.
Demonstrate how the development minimises greenhouse gas emissions (reflecting Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	The RPA capital works will deliver relevant components towards the SLHD's Carbon Neutral 2030 target, including efficient building design, active systems, and dedicated facilities for waste management.

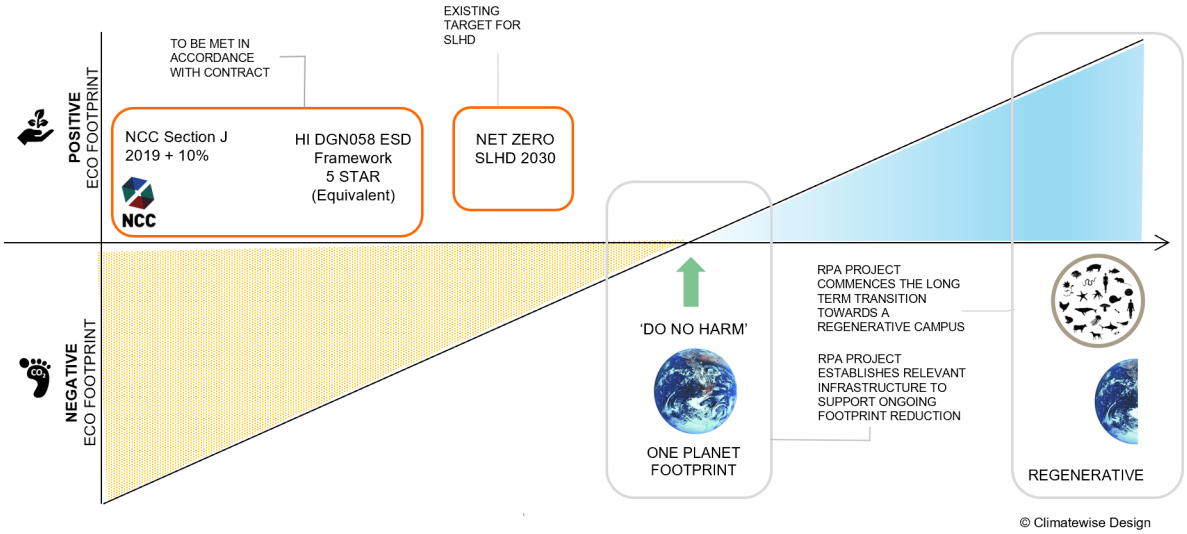

Figure 1 RPA Sustainability Targets & Objectives

2. Targets & Benchmarks

The RPA Project has a number of minimum and aspirational sustainability targets that have either been included in the original project brief or subsequently developed through stakeholder engagement.

2.1. SLHD Net Zero 2030

Net Zero by 2030 for SLHD, assumed to mean Net Zero for all Sydney Local Health District (SLHD) operations under the *Climate Active Standard for Organisations.*

The RPA project will contribute to the SLHD's aspiration of achieving Net Zero by 2030. Noting that the Net Zero target applies to all the SLHD operations, the ability of the RPA project to contribute to that outcome is limited.

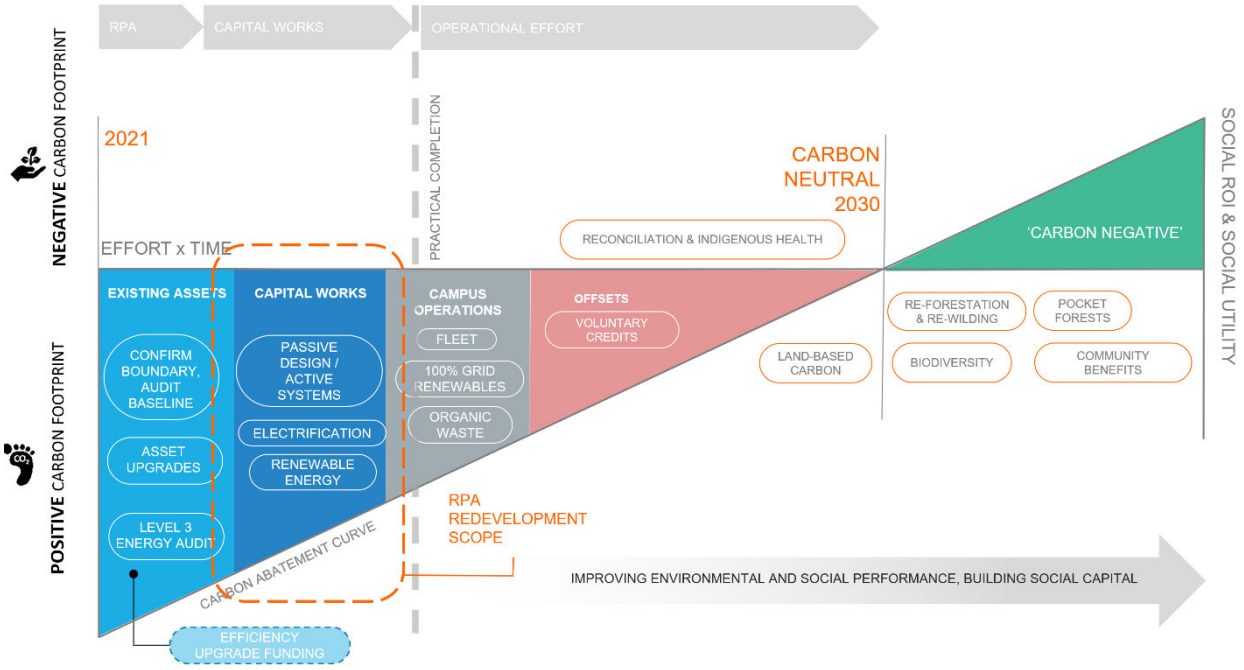

Figure 2 Net Zero Curve, presented during Workshop #1

It is assumed that the SLHD Net Zero 2030 Strategy will meet the Climate Active Standard for Organisations[1].

2.2. Improvement on NCC Section J

The RPA project brief includes a requirement to meet the targets and objectives outlined in Health Infrastructure's Design Guide Note (DGN) 058 'Environmentally Sustainable Development' (Rev B dated 18.03.21), which states;

"A minimum 10% improvement in energy efficiency compared to a baseline of National Construction Code (NCC) Section J compliance applicable to the development" (DGN058 p3of12)

2.3. HI ESD Evaluation Tool 60 points

A minimum of 60 points under the HI ESD Evaluation Tool (Appendix C to Design Guide Note 058, Revision B).

DGN-058 lays out an ESD Evaluation Tool (Attachment C – HI ESD Framework.xlsx) which is an in-house tailored version of the GBCA's Green Star Design & As-Built v1.3 rating tool.

The *Green Star Design & As-Built* rating tool has been in widespread use in the Australian property sector for a decade and was phased out on 17th December 2021 in favour of Green Star Buildings v1.0. We note that whilst the 'Green Star equivalence' approach is in common use by industry this is not endorsed nor supported by the GBCA (Green Building Council of Australia). DGN-058 clearly states that the ESD Evaluation Tool is not a version of Green Star and has undergone various reductions & exclusions to tailor the tool for the healthcare setting.

[1] Climate Active Carbon Neutral Standard for Organisations, Commonwealth of Australia 2020

3. Response to SEARs

The following schedule outlines how the RPA Redevelopment meets the ESD requirements described in Section 7(4) of the EP&A Act:

Table 2 Section 7 Compliance Table

Section 7(4) Requirement	Response
(a)(i) avoid… serious or irreversible damage to the environment	Project targets include Carbon Neutrality by 2030, addressing all operational carbon emissions, and Zero organic waste by 2030. The capital works component of the project will contribute to this objective through good passive design and efficient building services and systems.
(a)(ii) assessment of the risk-weighted consequences of various options	A Climate Risk Assessment & Adaptation Plan has been drafted for the redevelopment which addresses a range of climate-risk related aspects such as heat, local flooding, and rainfall. Having received input from the RPA asset management team, this tool is undergoing ongoing development in alignment with the design program.
(b) inter-generational equity	A whole-of-life cost benefit approach is being applied to the project, including consideration of the social benefits of key sustainability initiatives plus the contribution to preventive care within the catchment community.
(c) conservation of biological diversity and ecological integrity	Green Infrastructure is to be embedded in site planning and infrastructure works, including nature-based solutions to stormwater management and an enhanced urban forest canopy to support urban heat resilience.
(d)(i) polluter pays and (d)(ii) full life cycle of costs	The project is developing strategies to achieve a zero organic waste outcome (2030) and net zero carbon emissions in operation (2030). Further, as part of the project-wide sustainable water strategy all stormwater leaving the site will meet the minimum requirements described in Green Star Design & As-Built v1.3.
(d)(iii) environmental goals, having been established, should be pursued in the most cost-effective way	The SLHD Carbon Neutral 2030 goal has been adopted to inform key design considerations relating to building performance. In addition, the commitment to achieving a minimum of 60 points under HI's DGN-058 ESD Evaluation Tool will achieve a range of sustainability outcomes that are closely aligned with the industry-recognised Green Star rating too. Details are provided further below.

3.1. Sustainability Themes

The project is working to a set of sustainability themes under which a range of initiatives are described. These themes align with the DGN-058 ESD Evaluation Tool (Appendix C) which is structured around the *Green Star Design & As-Built v1.3* rating tool. The sustainability themes are as follows:

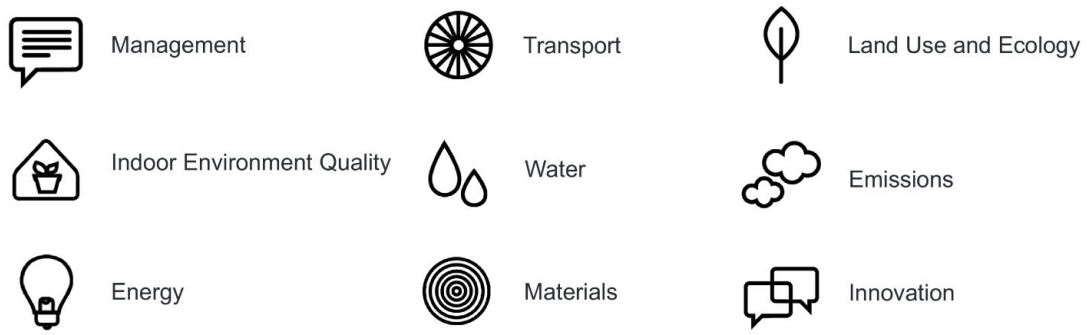

Figure 3 RPA Sustainability themes

3.2. Management

The following initiatives include practices and processes that enable and support best practice sustainability outcomes throughout the different phases of the project's design, construction and ongoing operation. This category also promotes practices that ensure a project will be sued to its optimum operational potential.

3.3. Initiatives Included

The following sustainability initiatives have been confirmed as being included at the end of Part 2 of the project program. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Note that 'ESD Code' in the following schedules refers to each initiative described in the DGN-058 ESD Evaluation Tool.

Table 3 Management Initiatives

ESD Code	Initiative	Description
1.0	Accredited (ESD) Professional	Appointment and active involvement of an Accredited Professional (under an Environmental Rating System) in order to ensure that the rating tool is applied effectively and as intended.
2.0	Environmental Performance Targets	Documented environmental targets. Achieved through the DGN-058 ESD Evaluation Tool and the RPA Climate Action 2040 Strategy. Targets include Net Zero by 2030, zero organic waste by 2030, best practice outside air rates to habitable spaces, and water efficiency targets.
2.1	Services and Maintainability Review	A comprehensive maintainability review of building fabric and services carried out at two stages during design and prior to construction.
2.2	Building Commissioning	A Commissioning Specification and Plan are to be developed, supporting the range of energy, water and resource efficiency measures included in the design
2.3	Building Systems Tuning	12 months of building services tuning carried out following completion, to tune building systems across all seasons
3.1	Implementation of a Climate Adaptation Plan	A project-specific climate risk assessment has been carried out which has informed the development of a Climate Adaptation Plan. Key climate risks include the following: **Heat**: increased maximum temperatures, increased frequency, duration, and intensity of heat events ('heat waves'). This informs building fabric performance, shading of external spaces, and temperature ratings of building services. **Rainfall**: reduced frequency of rain events without reduction in annual rainfall, meaning higher rainfall volumes in shorter periods. This informs drainage design including roofing, guttering (profiles & sections), and stormwater design.
4.1	Building Information	Providing simple description of the project's sustainability attributes and their operational needs, e.g., waste management, openable windows, water efficiency.
5.1	Environmental Building Performance	Setting minimum performance targets for energy, water, indoor environmental quality and waste. The RPA Climate Action 2040 Strategy and the DGN-058 ESD Evaluation Tool meet these requirements.
6.0	Metering	Sub-metering is to be provided to all major uses of energy and water.
6.1	Monitoring Systems	An active monitoring system is to be established to provide data on the sub-meters, enabling ongoing improvement of building performance
7.0	Environmental Management Plan	Project construction is to be carried out under the NSW EMP standards, managing environmental impacts. Included in the GC21 contract.

ESD Code	Initiative	Description
7.1	Formalised Environmental Management System	The head contractor is required to have ISO 14001 certification. Included in GC21 contract
8B	Operational Waste – Waste Facilities	Provision of sufficient space to support maximised avoidance of landfill waste, including management of comingled waste, clinical waste, FF&E waste (for recycling, reuse, or third parties), and organic waste.

3.4. Indoor Environmental Quality

The following initiatives enhance occupant comfort and well-being for staff, patients, and visitors. Many of these initiatives also improve the occupants' experience of the built environment.

3.5. Initiatives Included

The following sustainability initiatives have been included in the project. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 4 ESD Evaluation Tool compliance

ESD Code	Initiative	Description
9.1	Ventilation System Attributes	Air intakes are to be located in accordance with ASHRAE Standard 62.1:2013. The head contractor is required to keep all ductwork clean and sealed during construction. The Services & Maintainability Review (Item 2.1) considers cleanability of ductwork.
9.2	Provision of Outdoor Air	Outside air is to be provided at 50% higher than minimum in AS 1668.2:2012
9.3	Exhaust or Elimination of Pollutants	Exhaust from print / photocopy rooms and kitchens is directed outside without ability to recirculate. Photocopy equipment may be specified with low emissions in lieu of dedicated exhaust
10.1	Internal Noise Levels	Design to achieve internal ambient noise levels < 5dB(A) above Table 1 AS/NZS2107:2016. Aligns with ESG.
10.2	Reverberation	Below maximum stated in Recommended Reverberation Time in Table 1 of AS/NZS2107:2016. Aligns with ESG.
11.0	Minimum Lighting Comfort	Flicker-free lights, generally achieved by using LED lighting, high frequency ballasts
11.1	General Illuminance and Glare Reduction	Achieve lux levels in Table 11.1.1 Standards for Best Practice General Illuminance (Green Star Design & As-Built v1.3). Luminaires will be specific with diffusers or similar to hide bulbs for all lighting.
12.0	Glare Reduction	Glare from windows is controlled via any combination of fixed external shades, screens, blinds, or other means
13.1	Low VOC Paints, Adhesives, Sealants and Carpets	Low or zero VOC paint, adhesives and sealants. Generally Max TVOC 50g/L

3.6. Energy (Carbon Emissions)

To support the SLHD Carbon Neutral 2030 target a comprehensive long-term strategy is necessary. Noting that the RPAH Redevelopment project is able to deliver only a portion of the final carbon neutral outcome through capital works, the project can contribute in two main ways;

1. Superior passive design through building form & shape and green infrastructure, and
2. Through energy efficient building services design.

3.7. Energy (Carbon Emissions) Initiatives Included

The following sustainability initiatives have been confirmed as being included in the project. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 5 ESD Evaluation Tool Compliance

ESD Code	Initiative	Description
15E.0	Conditional Requirement: Reference Building Pathway	A project-wide target of 10% improvement over NCC Section J has been set
15E.1	Comparison to a Reference Building Pathway	There are various initiatives to exceed Section J +10% currently undergoing detailed design development and feasibility study. Initiatives under study include Photovoltaics (PV), to be applied to a minimum of 20% of suitable roof area.

3.8. Water

The development of a sustainable water ecosystem for the RPAH will support a number of the other sustainability concepts.

3.9. Water Initiatives Included

The following sustainability initiatives are included in the project. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 6 ESD Framework Compliance

ESD Code	Initiative	Description
18B.1	Sanitary Fixture Efficiency	High WELS ratings for all bathroom fixtures whilst meeting fit-for-purpose. Includes shower heads, basin taps, WCs, and urinals
18B.4	Landscape Irrigation	Sub-soil irrigation in lieu of surface irrigation, supported by moisture sensors to avoid over watering, and/or plants that do not require irrigation once established
18B.2	Rainwater harvest & Reuse (irrigation)	Include water efficient irrigation systems for all landscape
18B.5	Fire System Test Water	The use of fire system test water tanks for closed loop testing

3.10. Materials

The materials used in the construction of buildings can account for around a third of the building's overall carbon emissions footprint, which we call 'up front carbon' or embodied carbon. The way in which raw materials are sourced, then manufactured and processed into building products and ultimately brought to and installed on site can have a negative or positive impact on the environment and on the people involved in the process. The extent to which the construction process can avoid generating landfill waste also contributes to this impact.
These impacts include greenhouse gas emissions, the consumption of finite resources, and the pollution of air, soil and waterways that occurs through the manufacturing process.

This section addresses the key environmental impacts of materials used in construction, and includes design considerations that will support the RPAH's ongoing management of resources and waste reduction;

- The avoidance of waste and working towards a 'circular economy' where all resources are cycled within a system
- The minimisation of up-front or embodied carbon in construction materials through engagement with the supply chain, design and construction, and sustainable procurement
- Sustainable Procurement.

3.11. Materials Initiatives Included

The following sustainability initiatives have been included in the project. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 7 ESD Framework Compliance

ESD Code	Initiative	Description
19B.3	Building Reuse	A portion of existing buildings are to be retained (partial points allocation)
20.1	Structural and Reinforcing Steel	Steel is to be sourced from a responsible steel maker (ISO 14001 certification plus WSA Climate Action Program). Included in GC21 contract.
20.2	Timber Products	Timber is to be sourced from FSC or Australian plantation timber. Included in GC21 contract.
20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	PVC products are sourced from a responsible PVC manufacturer. Included in GC21 contract.
21.1	Product Transparency and Sustainability	Construction materials carry a % of sustainability credentials including post-consumer recycled content; product stewardship; and eco-certifications
22B	Construction and demolition waste	At least 90% of demolition and construction waste is diverted from landfill
19B.1	Concrete	30% reduction of Portland Cement is to be achieved by using alternative materials. Achievement is subject to supply of materials at the time of construction.
19B.2	Steel	Reduction in total steel mass compared to reference building (structural and reinforcement)

3.12. Land Use & Ecology

Worldwide and within Australia, rapid urbanisation is putting pressure on ecosystems and threatening biodiversity. Research and evidence demonstrating the positive impacts of green space and biodiversity on people and urban space is significant and continues to grow.

The category is built on five distinct principles

1. Protect ecological and biodiversity value, by encouraging development on land of limited value;
2. Minimise impacts to on-site ecology and biodiversity during and after construction;
3. Enhance ecological and biodiversity value by improving the site;

4. Connect natural networks by creating links between native or built corridors; and
5. Create and manage off-site natural spaces to restore the impact to nature from development.

These principles shift the focus of the built environment from a passive observer seeking to minimize impacts to one that is actively bringing nature and biodiversity back into cities. It also ensures the built environment considers impacts beyond its boundary and takes responsibility for rebuilding our natural environment.

3.13. Land Use & Ecology Initiatives Included

The following sustainability initiatives have been included in the project. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 8 ESD Framework Compliance

ESD Code	Initiative	Description
23.0	Endangered, Threatened or Vulnerable Species	The redevelopment project does not harm any endangered or threatened flora or fauna on site.
25.0	Heat Island Effect Reduction	A combination of initiatives to minimise the heat island effect on the campus. Roofing to have SRI >64, hard paving SRI>39, plus soft landscaping & shade elements

3.14. Emissions

This category aims to assess and manage environmental impacts of 'point source' pollution generated by projects. Negative impacts associated with buildings include damage to the environment through refrigerant leaks or disturbances to native animals. The following outcomes are targeted:

- The reduction of impacts to wildlife from light pollution
- The best practice application of microbial controls within air conditioning systems
- The reduction of impacts from refrigerant use and leaks

3.15. Emissions Initiatives Included

The following sustainability initiatives have been included in the project. These initiatives have either been confirmed as included in the design and/or budget or have been committed to as a project deliverable.

Table 9 ESD Framework Compliance

ESD Code	Initiative	Description
26.1	Stormwater Peak Discharge	Peak ARI stormwater discharge is not increased as a result of the development. Requires blend of permeable pavements, soakage, bioswales etc.
26.2	Stormwater Pollution Targets	Stormwater is cleaned to a specified level through a combination of built and/or natural infrastructure
27.0	Light Pollution to Neighbouring Bodies	Light spill into neighbouring properties is avoided
27.1	Light Pollution to Night Sky	No upward outdoor lighting is used unless light is directed onto buildings
29.0	Refrigerants Impacts	Overall Global Warming Potential (GWP) of refrigerants is minimised.

4. Conclusion

Based on activities to date the RPA Redevelopment project is meeting the SSDA Section 9 (ESD) requirements via the following key project sustainability targets:

- A minimum 10% improvement in energy efficiency compared to a baseline of National Construction Code (NCC) Section J (NCC 2019 assumed);
- A minimum of 60 points under the HI ESD Framework (Appendix C to Design Guide Note 058); and
- Carbon Neutral by 2030, meaning Net Zero for all of Sydney Local Health District's (SLHD) operations under the Climate Active Standard for Organisations.