

Mount Lofty Golf Estate

Sustainability Strategy Report

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Our vision is to think beyond the square.

Our mission is to reduce the impact on the environment of our client's actions by providing innovative solutions, challenging perceived thinking, and pushing the boundaries of achievement whilst using all resources in a sustainable way.

We confirm that all work has been undertaken in accordance with our ISO 9001 accredited quality management system.

Acknowledgement of country

The dsquared team wish to acknowledge the Traditional Custodians of all country throughout Australia, and their cultural, spiritual, physical, and emotional connection with their land, waters, and community. We pay our respects to all Elders past, present, and emerging.

Contents

1	Introduction.....	4
1.1	Introduction.....	4
1.2	Strategy.....	4
2	Performance.....	5
2.1	Green Star certification	5
2.2	Energy.....	5
2.3	Carbon emissions.....	6
2.4	Daylight.....	6
2.5	Water.....	7
3	Initiatives	8
3.1	Passive Design	8
3.2	Energy.....	9
3.3	Water.....	10
3.4	Waste.....	10
3.5	Indoor Environment Quality.....	11
3.6	Construction	11
3.7	Community and Social Sustainability.....	12
Appendix A	Sample daylight modelling results	13
Appendix B	Solar PV sketch layout	14

1 Introduction

1.1 Introduction

This report presents the Sustainability Strategies and Ecologically Sustainable Design (ESD) initiatives proposed for the Mount Lofty Golf Estate development, which will reduce the development’s impact on the environment in both construction and operation.

The proposed development has been designed with a holistic approach to ESD, creating an exemplar environment for all users including visitors, guests, and staff, while minimising energy use and greenhouse gas emissions.

This report follows the development of the master plan and building designs by the design team led by R-Architecture. Computer building simulation design techniques have been employed to inform the design initiatives and to assess the sustainability performance of the built form.

1.2 Strategy

The sustainability strategy and outcomes proposed are summarised as follows:



2 Performance

2.1 Green Star certification

The project will obtain a certified Green Star As-Built rating using the Green Building Council of Australia's new rating tool 'Buildings v1', which is the GBCA's next-generation rating tool replacing the previous 'Design and As-Built' tool.

The project is targeting a 5 Star outcome under the GBCA's new Buildings v1 rating tool. The GBCA defines 5 Stars as 'Australian Excellence' in sustainable building design.

The project will also obtain a Green Star Design Certification prior to the construction stage commencing.

Obtaining a third-party certified Green Star rating acts as a verification method for the project's ESD design initiatives and modelled performance outcomes. This approach will ensure ESD remains a core part of the project scope throughout the detailed design and construction phases.

2.2 Energy

The development is being designed and will be constructed to meet the energy efficiency requirements of the Green Building Council of Australia's Green Star Buildings v1 rating tool, which are as follows:

- The development will achieve at least 10% better energy and greenhouse gas emissions performance compared with a NCC / BCA 2019 deemed-to-satisfy reference case; and
- The façade and building fabric will exceed the NCC / BCA 2019 deemed-to-satisfy requirements for energy efficiency and thermal performance.

Preliminary modelling of the proposed concept design indicates that the development's **energy consumption will be 24% lower** than a NCC 2019 deemed-to-satisfy reference case, and its **carbon emissions from energy use will be 18% lower**. Refer to section 3 for a list of energy efficiency initiatives which will contribute to achieving these outcomes.

	Reference Building (NCC 2019 code compliant)			Mount Lofty Golf Estate		
	Electricity	Gas	CO ₂ emissions	Electricity	Gas	CO ₂ emissions
	kWh p.a.	MJ p.a.	kg CO ₂ e p.a.	kWh p.a.	MJ p.a.	kg CO ₂ e p.a.
Hotel	375,681	443,790	185,390	387,452	0	162,730
Facilities Building	404,465	159,948	179,824	323,067	0	135,688
Accommodation Pods	132,145	91,440	61,188	124,262	0	52,190
Total	912,291	695,178	426,402	834,781	0	350,608

Energy modelled performance results

	Reference Building (NCC 2019 code compliant)	Mount Lofty Golf Estate	Improvement
Energy use (MJ p.a.)	3,979,426	3,005,212	24%
CO ₂ emissions (kg CO ₂ e p.a.)	426,402	350,608	18%

Energy modelled performance summary

2.3 Carbon emissions

The development will be all-electric and will not use fossil fuels (natural gas) for heating, cooling, or hot water services, promoting the transition to 100% renewable energy from off-site and on-site sources.

20% of the development's annual electrical demand will be supplied by on-site renewable energy via a rooftop solar PV system.

A Zero Carbon Action Plan will be prepared and will include strategies for how the project will achieve net zero carbon emissions in operation. This includes strategies for phasing-out and eliminating all fossil fuels from the development and transitioning away from petrol- and diesel-powered golf carts and grounds maintenance vehicles and equipment.

2.4 Daylight

All hotel suites and public facilities (golf club, restaurant, and function rooms) have access to daylight in accordance with Green Star standards.

The daylight access has been verified using IES Virtual Environment building computer simulation software, with modelled results as follows. Sample plots from the daylight modelling are provided in Appendix A.

	Occupied floor area (sqm)	Compliant area (sqm) <i>(Note 1)</i>	Compliant % <i>(Note 2)</i>	Green Star result
Facilities Building	1,802	993	55%	Complies
Hotel Building	3,084	1,488	48%	Complies
Accommodation Pods	651	433	66%	Complies
Whole development	5,538	2,913	53%	1 out of 2 points achieved

Daylight modelling results

Note 1: Compliance target is a minimum of 160 lux of daylight achieved during >80% of daytime hours.

Note 2: Green Star targets are 40% compliant area for 1 point, or 60% for 2 points.

Refer also to Appendix A for sample daylight modelling plots.

2.5 Water

The development will achieve at least a 10% reduction in potable water use when compared to a reference building in accordance with the Green Star Buildings v1 rating tool requirements.

Preliminary water balance modelling indicates the development will achieve a 33% reduction in potable water demand when compared with a 'standard practice' reference case as defined by the Green Building Council of Australia. This exceeds Green Star Water Use requirements under the Buildings v1 rating tool.

A 50 kL rainwater storage tank will be provided and harvest rainwater for landscape irrigation, laundry services, and washdown of bin rooms and golf carts, which will contribute 13% of the buildings' total annual water demands, or 25% of the buildings' non-potable water demands.

	Standard practice	Mount Lofty Golf Estate
Total water demand (kL p.a.)	6,380	4,884
Rainwater contribution (kL p.a.)	Nil	639 (13% of demand)
Resultant potable water demand (kL p.a.)	6,380	4,245
Improvement achieved	-	33%

Water modelling results

3 Initiatives

3.1 Passive Design

The following passive design features are included:

1. Buildings are oriented north which captures free heating from the winter sun. External shade elements and balconies provide shade protection from the summer sun.
2. The building form, façade shading elements, and glazing system specifications have been informed by energy performance modelling and computer simulation techniques.
3. High performance double-glazed facades are provided throughout the development. Glass systems' solar heat gain coefficients (SHGCs) have been optimised for each building type depending on solar exposure, to provide an optimum balance between summer and winter comfort.

Façade glazing systems will meet the following performance specifications.

	U-value Whole of system W/m ² .K	Solar Heat Gain Coefficient (SHGC)	Visible Light Transmittance (VLT)	Glazing system type
Hotel Building	3.2 or less	0.40 or less	45% or higher	Double-glazed Neutral glass with low-E performance coating
Facilities Building	3.2 or less	0.40 or less	45% or higher	Double-glazed Neutral glass with low-E performance coating
Eco Pods	3.5 or less	0.50 or less	50% or higher	Double-glazed Neutral or clear glass

Façade glazing performance specifications

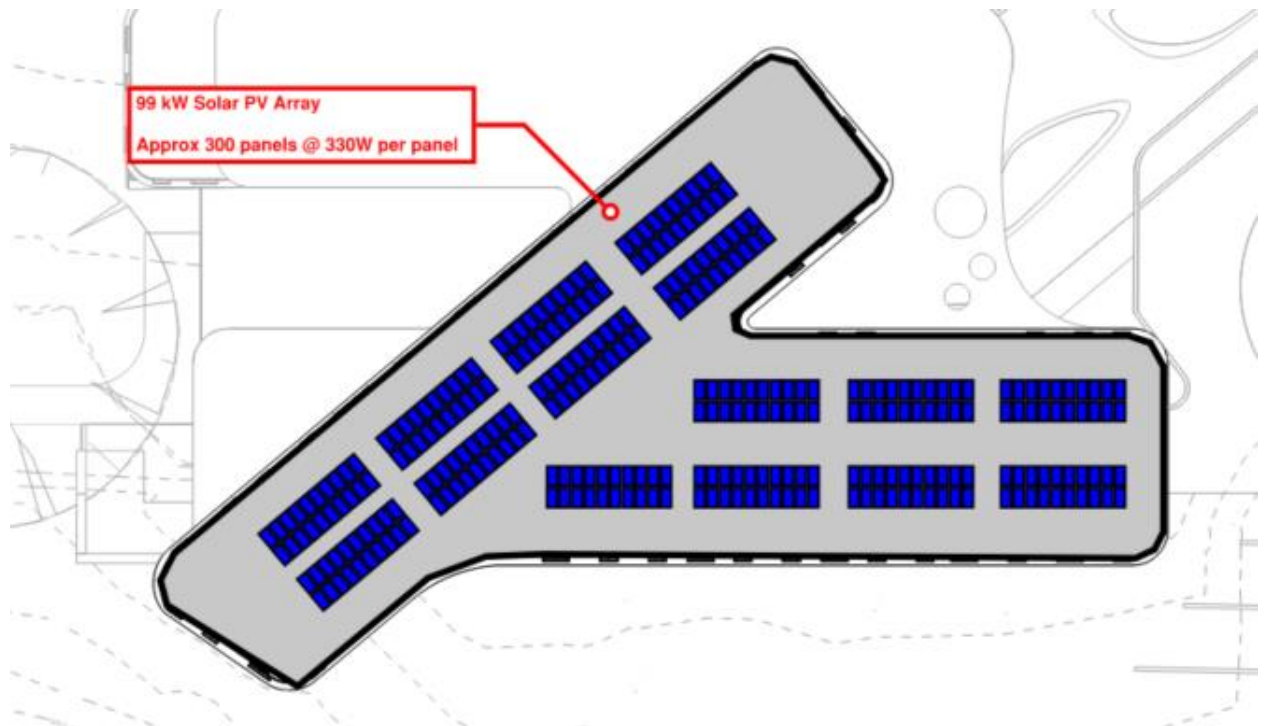
4. Natural ventilation is available in all hotel rooms and the gallery/café space, thereby reducing mechanical cooling demands.
5. The external façade will be subject to air leakage pressure testing to ATTMA standards, and the façade supplier required to meet prescribed air leakage rates as per GBCA / Green Star Standards. As well as significantly reducing the air conditioning energy consumption, this will also improve the indoor air quality, particularly during high external air pressure conditions.
6. Passive cooling from green roof, façade planters, and green landscaping around the buildings. Water transpiration from the plants and landscaping provides a natural cooling effect.
7. Light-coloured roof finishes and landscaping finishes will minimise heat absorption and reduce the heat island effect in accordance with Green Star standards. Roof finishes will have a solar reflective index (SRI) of minimum 82 and hardscaping elements at ground level will have a solar reflective index (SRI) of minimum 39.
8. Daylight is provided to all hotel rooms and indoor public spaces (Restaurant, Function Room, Golf Club and Sports Bar) which reduces artificial lighting demand.

3.2 Energy

The following Energy initiatives are included:

1. The building is fully electrified including cooling, heating, hot water, and cooking (no fossil fuels / natural gas).
2. A rooftop solar PV array provides renewable energy to power the building. Energy balance modelling demonstrates the system will provide at least 20% of the site's annual energy demand.

A solar PV layout sketch is shown as follows (refer also to Appendix B).



Proposed solar PV array

3. HVAC systems comprise high-efficiency air-cooled heat pump thermal plant for heat rejection and heat injection. All central plant is contained within distinct plant enclosures which minimises acoustic impacts and visual obtrusiveness of plant equipment.
 - A ground-loop heat exchange system is being explored as an alternative heat rejection strategy, in collaboration with specialist consultants GeoExchange. This option will further improve heating and cooling system efficiencies and will provide a natural and renewable source of thermal energy from the ground.
4. A shared condenser water loop system will provide heating and cooling energy to the Hotel and Facilities buildings using an efficient centralised approach.
5. Heat recovery between HVAC and domestic hot water systems via the shared condenser water loop system. In summer when HVAC systems are in cooling mode and rejecting heat from the occupied spaces into the condenser water loop, the rejected heat energy will be recovered and used to heat water for showering and other domestic hot water uses.
6. High-efficiency electric heat pump domestic hot water plant. System efficiency rating (Coefficient of Performance) will be in excess of 300% efficient.

7. All hotel rooms have access to natural ventilation via private balconies. Air-conditioning will shut down automatically whenever the balcony door is left open, to save energy when guests choose to open up their room and allow natural ventilation and external breezes to enter.
8. Air-conditioning and lighting in hotel rooms will switch off automatically when rooms are unoccupied.
9. Economy cycle HVAC mode provides free-cooling in public spaces (Restaurant, Function Room, Golf Club and Sports Bar).
10. Demand-controlled ventilation including indoor CO₂ monitoring will reduce thermal loads in public spaces (Restaurant, Function Room, Golf Club and Sports Bar) whilst maintaining a high indoor air quality at all times.
11. Automatic BMS controls for retail and commercial HVAC systems with distinct thermal zoning to suit the comfort needs of individual areas.
12. Energy efficient LED lighting throughout.
13. Energy metering and sub-metering of distinct load centres, connected to a fully integrated BMS.

3.3 Water

The following Water initiatives are included:

1. A rainwater capture and reuse system will provide rainwater for landscape irrigation, laundry services, and washdown of golf carts/waste storage rooms. A 50 kL rainwater storage tank will contribute 13% of the development's total water demand / 25% of non-potable water demand.
2. Landscaping comprises native and drought-tolerant planting species which have low irrigation water demands.
3. Water efficient fittings with the following minimum WELS ratings:
 - Taps 6 Stars
 - WCs 4 Stars
 - Urinals 4 Stars
 - Showers 4 Stars
4. Selecting water-efficient washing machines and dishwashers which are within one Star of the highest available water rating.
5. No water will be consumed for HVAC heat rejection purposes, i.e. no cooling towers. All HVAC heat rejection will be air-cooled or via ground heat exchange.
6. Stormwater systems designed such that pre-development peak stormwater outflows will not be exceeded, and all stormwater run-off will be appropriately treated before discharge to the local waterways. The use of stormwater detention tanks will contribute to meeting these outcomes.

3.4 Waste

The following Waste initiatives are included:

1. Construction waste will be minimised through efficient design techniques including standardisation and off-site pre-fabrication wherever practicable. A minimum 90% diversion from landfill rate will be targeted.
2. Separate bins will be provided for organic waste, recyclable waste, and general waste, to encourage and facilitate diversion of waste from landfill.

3. Waste storage facilities for the collection and disposal of general, recyclable, organic waste, and bulky waste, which will be separated on site to facilitate ease of disposal for recycling.
4. A site-specific Operational Waste Management Plan will be developed in accordance with Green Building Council of Australia guidelines for best practice waste management. The Plan will inform the design of waste storage and handling facilities, waste bin provisions, and signage requirements.

3.5 Indoor Environment Quality

The following Indoor Environment Quality initiatives are included:

1. All hotel suites and accommodation pods have access to natural ventilation via private balconies.
2. Mechanical ventilation will be provided to hotel rooms when balcony doors are closed, and to all public spaces. Outside air supplies will be in accordance with Green Star and AS1668.2 minimum requirements.
3. Daylight access is provided in all hotel suites, accommodation pods, and public spaces (Restaurant, Function Room, Golf Club and Sports Bar) in accordance with Green Star criteria (minimum 160 lux of daylight during at least 80% of daytime hours).
4. Glare from sunlight is managed through a combination of external shade elements, internal blinds, and building orientation (north-facing aspect).
5. Views to the surrounding natural landscapes are available in all occupied spaces.
6. The use of low VOC and low formaldehyde paints, sealants, adhesives, carpets, coverings, and furniture.
7. Acoustic performance in occupied spaces will be in accordance with Green Star and AS 2107 standards. Façade systems, acoustic treatments to internal ceilings and walls, and services plant will be designed to meet Green Star acoustic standards. This includes background noise levels, reverberation levels, and acoustic privacy requirements.
8. Air conditioning systems will be centralised, concealed, and located in acoustically sheltered plant areas, such that external noise will not impact on the amenity of guests, customers, or staff.

3.6 Construction

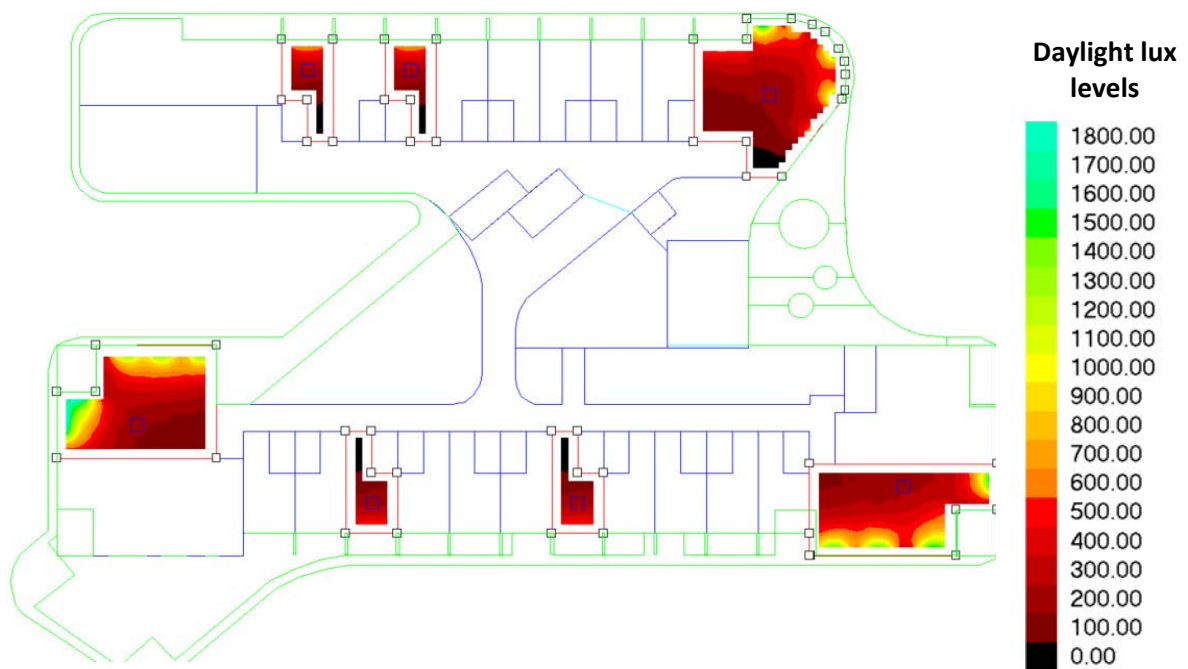
The following Construction initiatives are included:

1. Embodied carbon of construction (i.e. 'upfront emissions') will be at least 10% lower than a reference case, in line with Green Star requirements.
2. Refrigerants with low Global Warming Potential (GWP) ratings will be specified for central thermal plant and hot water plant.
3. Building materials which are made from recycled materials e.g. fly ash in concrete, reinforcement bar, recycled content floor coverings, and recycled insulation products, wherever viable.
4. Head contractor will be required to implement an Environmental Management Plan compliant with Green Star standards.
5. Using off site pre-fabrication techniques to reduce on site construction time, waste, and greenhouse gas emissions, wherever practicable.
6. Locally sourced materials and labour will be sought wherever viable.
7. Using Building Information Modelling (BIM) as a design and construction management tool to minimise on-site clashes and abortive/wasteful work.

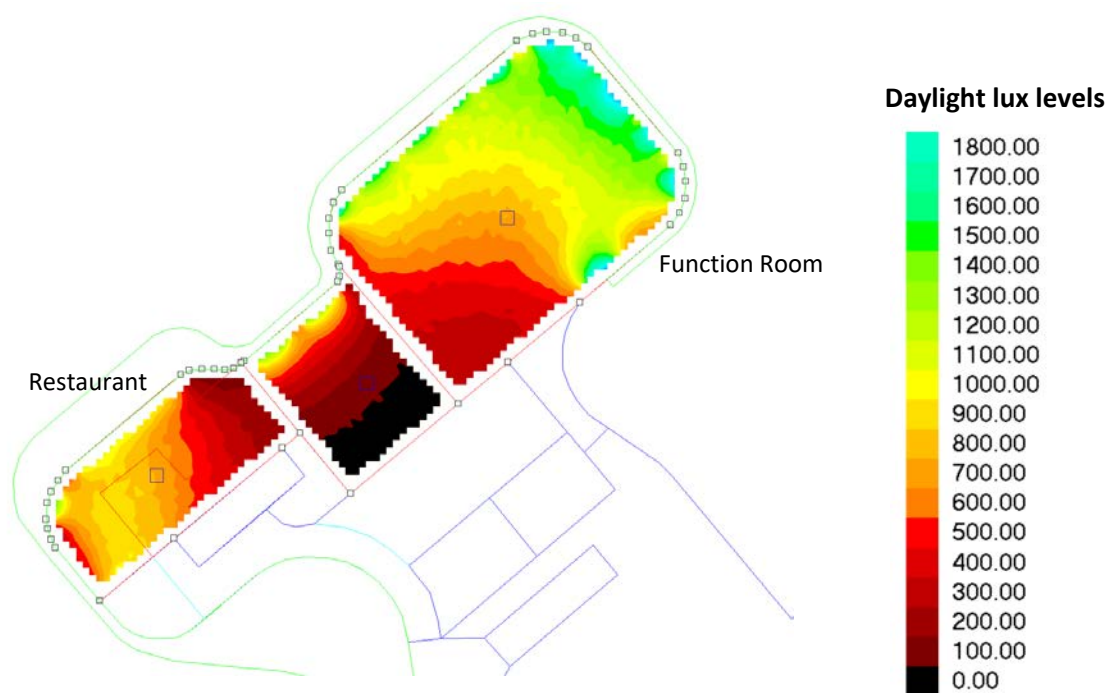
3.7 Community and Social Sustainability

The following social sustainability initiatives are included:

1. The development includes a Wellness Centre, Gym, and extensive common outdoor amenity space.
2. The Facilities building is designed and located as a shared gathering point for various users and visitors including golf players, hotel patrons, restaurant customers, gym users, and Function Room guests. Shared outdoor terraces encourage interaction and community between the various user groups.
3. A communal creche / childcare is provided in the Hotel building.
4. All public spaces have good access to daylight, ventilation, and views to the surrounding landscapes.
5. Heritage listed Scent Factory building from the historic Mount Lofty Flower Farm will be restored as part of the development works, and incorporated as an attraction feature for guests and visitors to the development.
6. Local ecology and vegetation will be featured and integrated into the development.



Daylight modelling plots – Hotel building, Level 1



Daylight modelling plots – Facilities building, Level 1

