LUCID
CONSULTING AUSTRALIA

(NSW) - BLUE SKY FUNDS - 4-18 DONCASTER AVENUE, KENSINGTON

Sustainability Report

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1. EXECUTIVE SUMMARY

This report provides an overview of the sustainability initiatives considered for the development application of the proposed Student Accommodation development at 4-18 Doncaster Avenue, Kensington.

The intent of each initiative is to improve the overall environmental performance of the development. Collectively, these initiatives will:

- Reduce energy and water consumption.
- Reduce the ecological footprint of the building and its occupants.
- Improve thermal comfort and indoor air quality.
- Improve occupant well-being.
- Enhance liveability of the development.

The following initiatives have been identified to achieve the above criteria and are considered for this project.

Table 1: Summary of sustainability initiatives considered for this development.

PASSIVE DESIGN FEATURES	▪ High performance building fabric. ▪ High performance glazing. ▪ External shading overhangs to facades with high solar exposure. ▪ Access to natural ventilation & daylight. ▪ Operable windows. ▪ Uniform building envelope (architectural massing).
ENERGY	▪ High efficacy (Lumens/Watt) luminaires. ▪ Automated lighting controls. ▪ High efficiency vertical transport systems.
WATER	▪ Low water-dependent landscaping. ▪ Low water-dependent landscaping. ▪ Rainwater harvesting and reuse for toilet flushing, clothes washing machines, wash-down areas and irrigation.
TRANSPORT	▪ Bicycle parking spaces with maintenance stations. ▪ Motorcycle parking spaces. ▪ Access to nearby public transport.
MATERIALS	▪ Low embodied energy materials. ▪ Low pollutant emissions materials.
WASTE	▪ Consolidated and separated waste storage areas. ▪ Storage area away from occupied spaces to prevent exposure to foul odours.
OCCUPANT WELL BEING	▪ Access to indoor/outdoor communal spaces. ▪ Access to communal facilities (i.e. gym, kitchen)
BUILDING MANAGEMENT SYSTEM	▪ Control operation of air conditions systems. ▪ Energy/water data monitoring tool.

2. INTRODUCTION

2.1 OVERVIEW

The proposed Student Accommodation development at 4-18 Doncaster Avenue, Kensington is deemed a Class 3 building in accordance with the 2016 National Construction Code (NCC).

The development comprises of the following:

- Basement carpark.
  - 60 bicycle parks.
  - 54 motorcycle parks.
  - 56 car parks.
- Common areas.
- 3-level building including 276 beds total (combination of Studio, Twin Studio, Clusters).

Figure 1: Site plan (Google Maps).

2.2 OBJECTIVES

The intent of each of the proposed sustainability initiatives is to add value to the project by improving various environmental aspects of the development. The overall objectives are to:

- Reduce energy and water consumption.
- Reduce the ecological footprint of the building and its occupants.
- Improve thermal comfort and indoor air quality.
- Improve occupant well-being.
- Enhance liveability of the development.

2.3 BASIX COMPLIANCE

In accordance with NSW Government legislation, Class 1 and Class 2 dwellings are required to be benchmarked by the Building Sustainability Index (BASIX). As this development is Class 3, it will not require BASIX assessment.

2.4 SEARs COMPLIANCE

In accordance with the Secretary Environmental Assessment Requirements (SEARs), the following direct responses have been prepared to the ESD principles defined in clause 7(4) Schedule 2 of the EP&A Regulation 2000. The sustainability initiatives identified in below sections enable the below responses to be achieved.

ESD Principle	Project Response
(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,*	This project intends to minimise holistic impact to the environment by achieving the following: ▪ Reducing consumption of resources (energy and water). ▪ Reducing emissions of GHG emissions. ▪ Increasing ability for carbon sequestration.
(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,	This project intends to ensure the construction of a building which achieves the following to ensure inter-generational equity: ▪ Improving indoor air quality and occupant health and well being. ▪ Reduction of environmental footprint. ▪ Community building facilities.
(c) conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,	This project intends to maximise conservation of biological diversity and ecological integrity, by achieving the following: ▪ Creating new communal outdoor landscaped spaces.
(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*	This project intends to improve valuation, pricing, and incentive mechanisms by achieving the following: ▪ Facility management team to develop strategic operational goals and monitor the performance of the student accommodation building.

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.*	▪ Costs incurred by the resources/services consumed by occupants are forwarded for their direct payment. This could be included within rent fees for students.

2.5 2016 NCC SECTION J ENERGY EFFICIENCY COMPLIANCE

For development application, a preliminary Section J energy efficiency assessment in accordance with Section J Energy Efficiency Deemed-to-Satisfy (DTS) requirements was conducted based on architectural drawings dated 19 December 2018.

The following summarises the preliminary assessment which will be progressed and formalised during design development for Building Approval.

Part J1 Building Fabric	The roof (or exposed ceilings) of the building will achieve a minimum total R-value of R3.7, based on a medium roof colour (solar absorptance 0.4 to 0.6). The external walls of the building will achieve a minimum total R-value of R2.8. The exposed floors of the building will achieve a minimum total R-value of R2.0.
Part J2 Glazing	Glazing is proposed as part of the building's thermal envelope. The Glazing Calculator, NCC 2014 Volume One, will be used to define the minimum glazing performance requirements.
Part J3 Building Sealing	Minimum requirements will be achieved designed considering: ▪ Self-closing dampers on all exhaust systems serving conditioned spaces. ▪ Building detailing which minimises air leakage.

Part J4*	**No requirements*
Part J5 Air-Conditioning and Ventilation	Minimum requirements will be achieved designed considering: ▪ Proprietary air conditioning systems. ▪ Automatic controls.
Part J6 Artificial Lighting and Power	Minimum requirements will be achieved designed considering: ▪ Maximum illumination power density calculations will be conducted. ▪ Automatic controls.
Part J7 Heated Water Supply and Swimming Pool and Spa Pool Plant	Heated hot water systems are proposed as part of the building services. Heated hot water systems will be designed to achieve minimum requirements.
Part J8 Facilities for Energy Monitoring	Facilities for energy monitoring will achieve minimum requirements for buildings with floor area greater than 2,500m^2.

3. ENERGY

Initiatives that have a direct impact on reducing energy consumption have been separated into the following categories:

- Passive design features.
- Energy efficiency.
- Renewable energy.

3.1 PASSIVE DESIGN FEATURES

Passive design features have a direct impact on thermal comfort within the occupied spaces. Subsequently reduced energy consumption for air conditioning and ventilation systems.

The following passive design features are being considered for incorporation into the buildings design.

- **High performance building fabric** - wall, floor and roof insulation R-values will meet best practice guidelines.
- **High performance glazing** - the performance of glazing systems will be selected to suit the thermal requirements of each apartment. Doing so will allow apartments to benefit from free heating provided by the sun during winter while restricting solar heat gain during summer.
- **External shading overhangs** – to assist controlling solar heat gain during summer, external shading overhangs will be considered to facades with high solar exposure.
- **Access to natural ventilation & daylight** - sizing and positioning of windows to provide sufficient natural ventilation and daylight to the occupied space, reducing the demand for both mechanical air-conditioning and artificial lighting.
- **Operable windows in common corridors and apartments** - these areas have a constant demand for ventilation and lighting, each of which can often be provided naturally through these windows.
- **Uniform building envelope (architectural massing)** - the building has been designed to consist mostly of typical floors, which are identical in layout to the floors above and below. The result is a more energy efficient building envelope with a minimal amount of exposed floors and exposed ceilings on intermediate floors, reducing heat losses in winter and heat gains in summer.

3.2 ENERGY EFFICIENCY

The following energy efficient features are being considered for this building development.

- **High efficacy (Lumens/Watt) luminaires** – technologies such as LED will be used throughout the building to reduce energy consumption required for lighting.
- **Automated lighting controls** – motion sensor activated lighting within common areas.
- **High efficiency air conditioning systems** – Variable refrigerant flow (VRF) type heat pump condensing units. These systems are more efficient than conventional inverter type technologies.
- **High efficiency vertical transport systems** – high efficiency lifts incorporating LED lighting.
- **Access card switches** – these switches will ensure power is shutdown to all lighting and air conditioning within the accommodation unit when occupants exit.

3.3 **RENEWABLE ENERGY**

Solar photovoltaic (PV) energy generation system will be considered as a roof-mounted installation, directly offsetting the daytime electrical load of the building. Due to the occupancy profile of this building resembling highly transient occupants with varying hours of occupancy each day. It is suggested that the PV array capacity will only consider the minimum daytime load to maximise system feasibility.

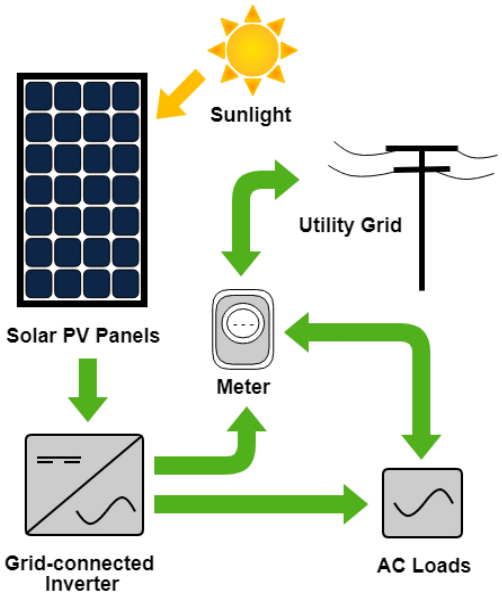

Figure 2: Solar PV system schematic.

4. WATER

Initiatives that have a direct impact on reducing water consumption have been separated into the following categories:

- Low flow fittings and fixtures.
- Low water-dependent landscaping.
- Rainwater harvesting.

4.1 LOW FLOW FITTINGS AND FIXTURES

The performance of fittings and fixtures can determine the annual water consumption of a building. Provision of low-flow fittings and fixtures including taps, water closets and shower heads with high Water Efficiency Labelling and Standards (WELS) ratings can significantly reduce the development's potable water consumption. The WELS rating provides a verified measure of performance.

It is proposed to select water fixtures and fittings based on the following minimum performances:

- All tapware to have a consumption rate not greater than 6.0 L/min (i.e. 5 star WELS rating)
- Showerheads to have a consumption rate not greater than 9.0 L/min (3 star WELS rating)
- Water closets to have a consumption rate not greater than 3.5 L/flush (4 star WELS rating)

The following table demonstrates the potential water savings achievable through the use of low-flow equipment:

Table 3: Annual water consumption comparison per person.

Equipment	Average Dwelling		4-18 Doncaster Avenue Development			
	Flow Rate	*Daily Consumption (per person)*	*WELS Rating*	*Flow Rate*	*Daily Consumption (per person)*	*Improvement*
Taps	9.0 L/min	48 L	5 Star	6.0 L/min	32 L	33%
Showers	15.0 L/min	135 L	3 Star	9.0 L/min	81 L	40%
WC's	8.0 L/flush	48 L	4 Star	3.5 L/flush	21 L	57%
Total daily consumption per person	-	231 L	-	-	134 L	**42%**

4.2 LOW WATER-DEPENDENT LANDSCAPING

Reducing the water-dependence of landscaping ensures water consumption can be minimised whilst aiming to conserve biological diversity and ecological integrity.

Many species native to Australia and considered drought tolerant and will be considered as part of the flora selection.

4.3 RAINWATER HARVESTING

Rainwater harvesting will be considered for this development for reuse in toilet flushing, clothes washing machines, wash down bays, and irrigation. This initiative will reduce potable water consumption.

The rainwater tank is proposed to be located within the basement carpark and will require a pumpset to supply rainwater to the levels above.

5. ADDITIONAL SUSTAINABILITY INITIATIVES

5.1 SUSTAINABLE TRANSPORT

Parking spaces for 54 motorcycles are proposed within the basement carpark. Additionally 60 bicycles parking spaces are also proposed. Maintenance stations for occupants to repair and maintain their bicycles are also proposed.

This station includes all tools necessary to perform basic bike repairs and maintenance i.e. changing flat tyres, pumping tyres, making minor adjustments. This will have minimal cost implications and will be of great interest to any prospective buyer who rides a bicycle regularly.

The proposed development is located nearby bus-stops of main routes to enable occupants access to sustainable transport across the city.

5.2 SUSTAINABLE MATERIALS

Low embodied energy and low pollutant emissions materials will be considered for the construction of the development.

5.3 WASTE

Consolidation and separation of waste streams within the basement carpark. The benefits of this waste management arrangement are as follows:

- Maximising recycling of waste materials.
- Reducing foul odours near occupied spaces.

5.4 OCCUPANT HEALTH & WELL BEING

Occupant health & well being is being considered with the provision of indoor outdoor and communal areas and facilities to encourage socialisation between occupants. Alternatively well being of occupants have been considered whilst within their apartments with access to natural light and ventilation.

Communal facilities include:

- Gymnasium.
- Communal kitchen.
- Laundry.

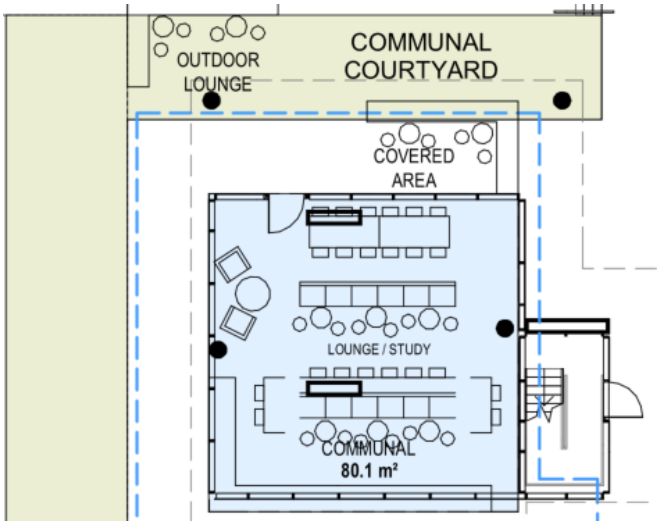

Figure 4: Communal areas indoors and outdoors.

5.5 **BUILDING MANAGEMENT SYSTEM**

The development will consider the installation of a Building Management System (BMS). This system will be responsible for the complete operation of all mechanical plant, including scheduling of equipment and automatic shutdown of equipment after hours. This will prevent operation of equipment when spaces are unoccupied and will assist in ensuring all mechanical plant is operated in an efficient manner.

The BMS will consider interfacing with energy/water meters to assist collation of consumption data.

Alternatively, A key and simple initiative to minimise energy and water consumption is by monthly tracking. This initiative can be conducted by anyone who has access to the energy and water bills.

The objective of tracking the resources consumed is to identify any anomalies between months and between different years. These anomalies can be identified if resource consumption does not align with occupant/building trends.