# ENERGY EFFICIENCY & ESD REPORT

**61 North Steyne, Manly**

**Prepared for:**

Lindsay Bennelong Developments
PO Box 7105, Baulkham Hills 2153

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# BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Lindsay Bennelong Developments (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

# DOCUMENT CONTROL

| Reference | Date | Prepared | Checked | Authorised |
|---|---|---|---|---|
| 610.30986-R01-v1.1 | 14 April 2023 | Olivia Wang | Neihad Al-Khalidy | Neihad Al-Khalidy |
| 610.30986-R01-v1.0 | 04 November 2022 | Olivia Wang | Neihad Al-Khalidy | Neihad Al-Khalidy |
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# EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Lindsay Bennelong Developments to prepare a qualitative Ecologically Sustainable Design (ESD) assessment for the proposed development at 61 North Steyne, Manly.

This study has been prepared in accordance with the Manly DCP 2013, 2019 National Construction Code (NCC) and the Building Sustainability Index (BASIX).

The proposed development will incorporate passive and active energy saving measures to enhance energy efficiency and ecologically sustainable development where appropriate. A thermal comfort assessment of the proposed residential development is carried out using NatHERS software and BASIX tools to provide a quantitative estimate of the development's ESD performance during detailed design stage.

The proposed development will comprise the follows:

- Basement car parking;
- Residential apartments are from ground level to level 5.

The site is located at beachfront long Manly Beachfront, conveniently minutes' walk to recreational opportunities including parks, shops, gyms, sports facilities etc. Access to these facilities reduces the requirement for long-distance motorised transport for most recreational activities. This would be a positive feature of the development with regards to sustainability as this clearly avoids greenhouse gas emissions that would otherwise have been produced if residents had to travel long distances for recreational activity.

The site location can also provide easy access to nearby transport - ferry wharf. Additional access to buses provides transportation options for building occupants. The proposed development will encourage occupants and users of the development to use public transportation and minimise automobile use.

The proposed development will incorporate passive and active energy saving measures to enhance building operating performance where appropriate. Overall, positive Ecologically Sustainable Design (ESD) and energy efficiency features are currently in a few design areas, incorporating the following:

- The form dictated by the site has been designed to maximise the solar access of residential units;
    - The living rooms and private open spaces of the proposed apartments will receive a minimum of 2 hours direct sunlight on the Winter Solstice between 9 am and 3 pm.
- The proposed development will incorporate passive and active energy saving measures such as operable windows to enhance natural ventilation through serviced apartments, where appropriate;
    - The proposed residential units will be naturally cross ventilated.
- Incorporation of high thermal mass;
- Provision of 5 kW PV solar system;
- Consideration of a solar – electric boosted hot water system;
- Car park ventilation system to be provided with Variable Speed Drives (VSD's) and CO monitoring;
- Landscaped elements to feature to building car lift rooftop areas to increase green spaces;
- Provision of native landscaping;

# EXECUTIVE SUMMARY

- Separate tenancy metering;
- Appropriate glazing selection in accordance with BASIX to cut excess solar heat gains for apartments;
- Provision of end of trip facilities for bicycles and other alternate transportation;
- Provision of parking for small or alternate vehicles, such as motorbikes;

The following recommendations have been made to improve upon the existing key sustainability features:

- Water efficient bathroom and kitchen fittings;
    - 4 star all toilet flushing system;
    - 4 star flow tapware; and
    - 4 star shower head (> 4.5 but <= 7.5L/min).
- Minimum 3.5-star water efficient and minimum 3.5-star energy efficient dishwashers and clothes washers; and

Recommendations regarding the mechanical ventilation system, lighting control, building fabric requirements, domestic hot water, other appliance and operational waste etc, have also been made within the body of the report. These features will help to achieve significant reductions in the energy and water required by the development from construction and operation.

With the acknowledgements and recommendations contained within this report we find that the proposed development can achieve outcomes that comfortably exceed relevant BASIX certificate ratings:

- The proposed residential development will enjoy a high level of thermal comfort gaining an average 7.2 NatHERS star rating.
- The project will achieve a water section score of 40 (BASIX requirement: 40)
- The project will achieve an energy section score of 40 (BASIX requirement: 35)

It is recommended that ESD initiatives continue to be developed and implemented during the detailed design stage of the project.

# CONTENTS

# CONTENTS



# DOCUMENT REFERENCES

## TABLES



## FIGURES

# 1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Lindsay Bennelong Developments to prepare a qualitative Ecologically Sustainable Design (ESD) assessment for the proposed development at 61 North Steyne, Manly.

This study has been prepared in accordance with the Manly DCP 2013, 2019 National Construction Code (NCC) and the building Sustainability index (BASIX).

## 1.1 Site Description

The proposed development is located west of North Steyne. Bounding the site to the north will be Denison Street, with existing development sitting at the site boundaries to the west and south. Surrounds of the site comprise a mix of medium to high rise development. The site location and surrounds are shown in Figure 1 below.

**Figure 1 Aerial image of the Development**

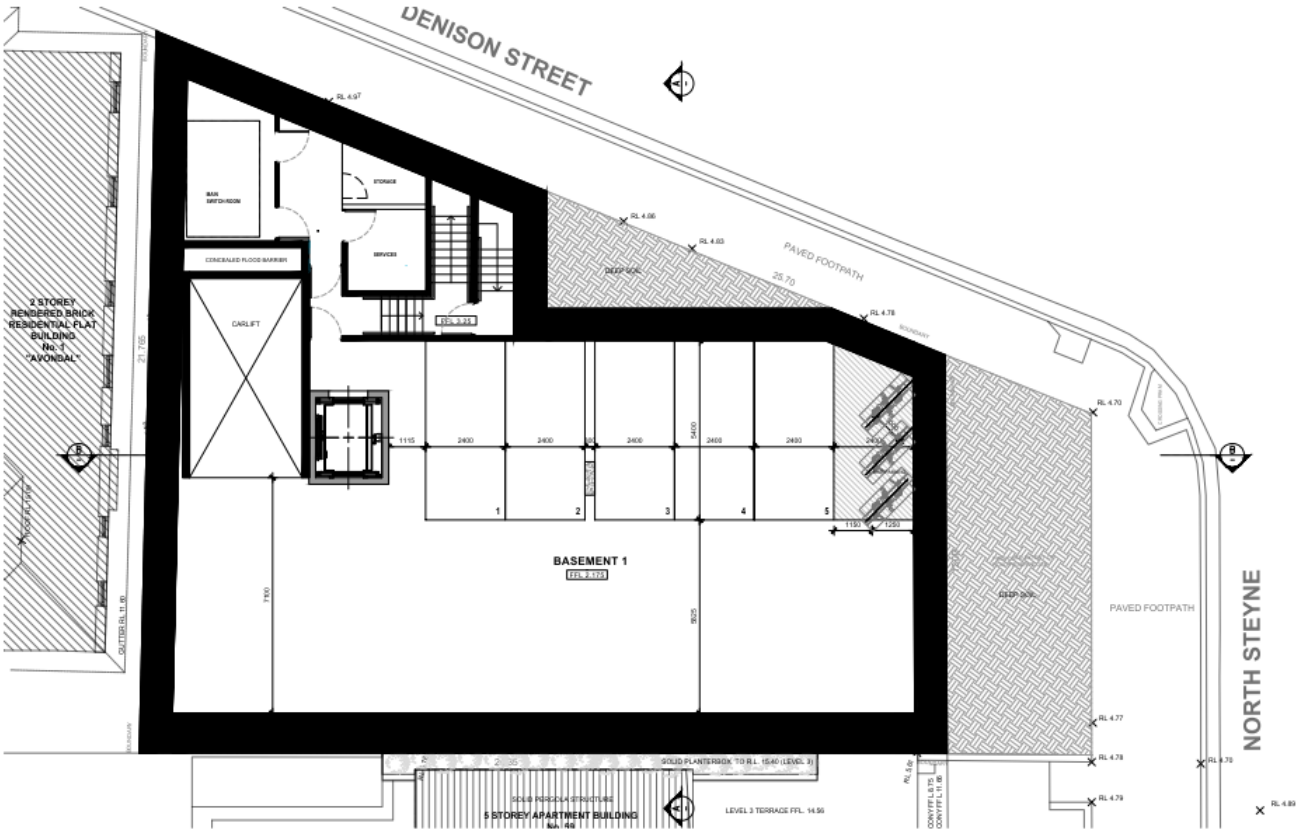

Image: Nearmap, July 2022

## 1.2 Development Description

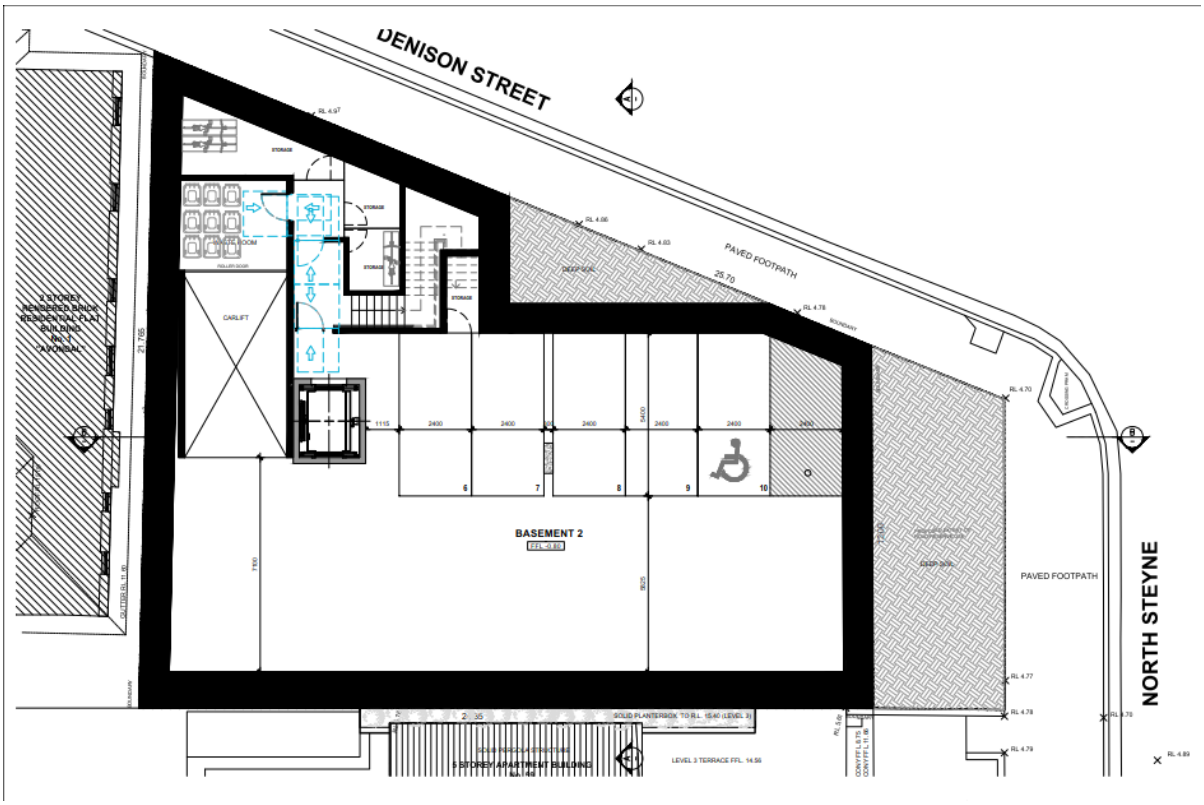
From the plans provided, the proposed development will consist of the followings:

- Basement car parking;
- Residential apartments are from ground level to level 5.

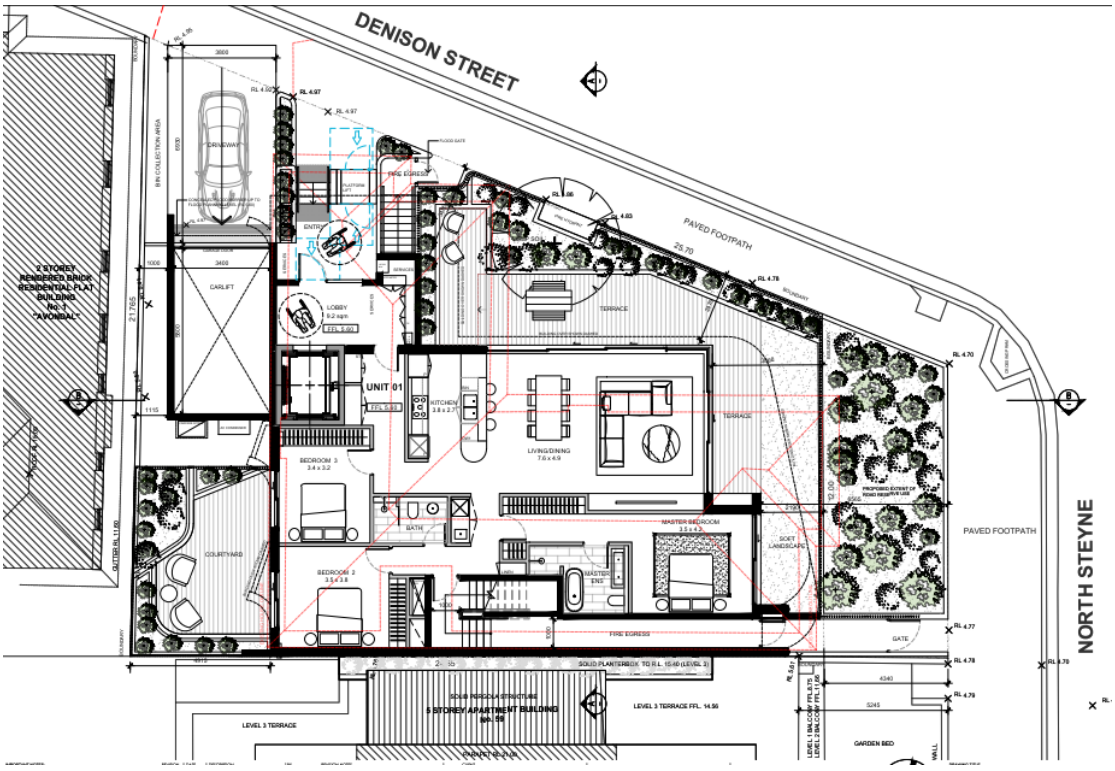
**Figure 2 Development Floorplan – Basement 1**



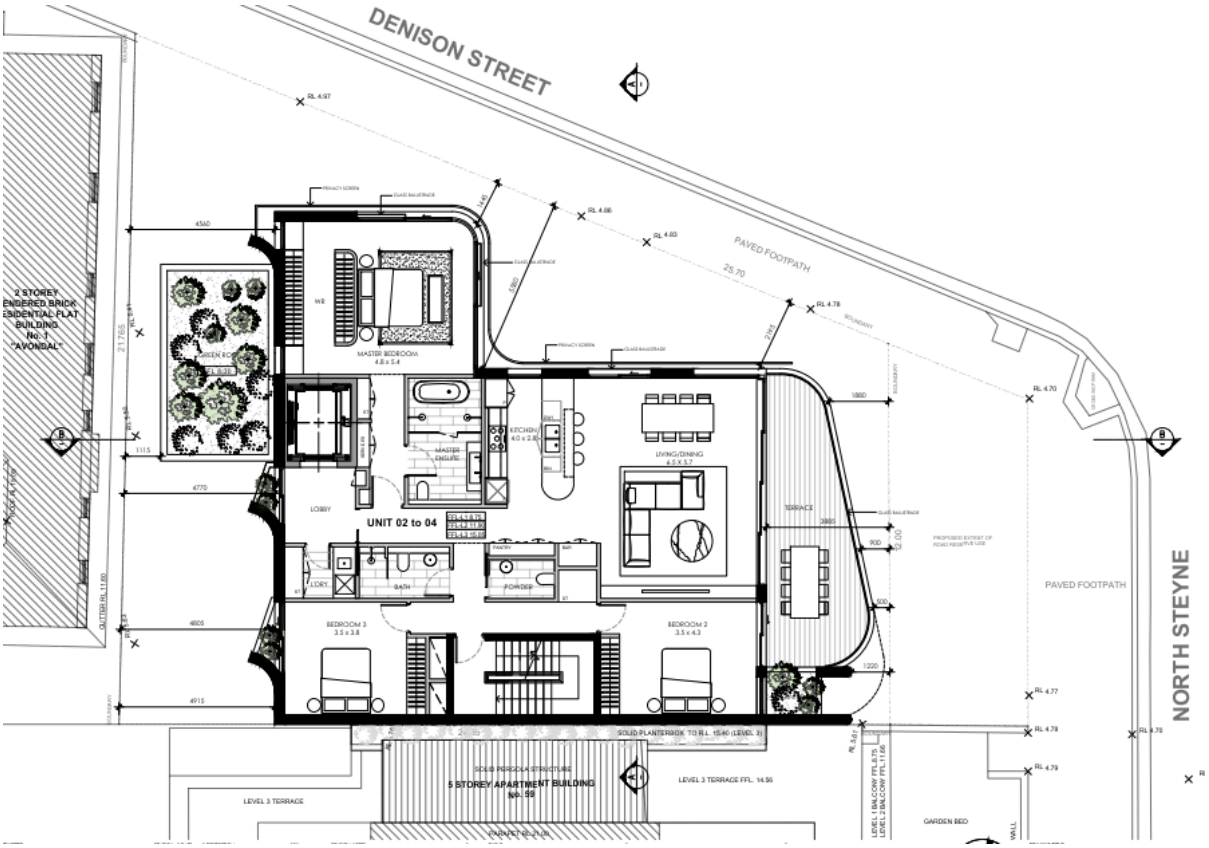
## Figure 3 Development Floorplan – Basement 2



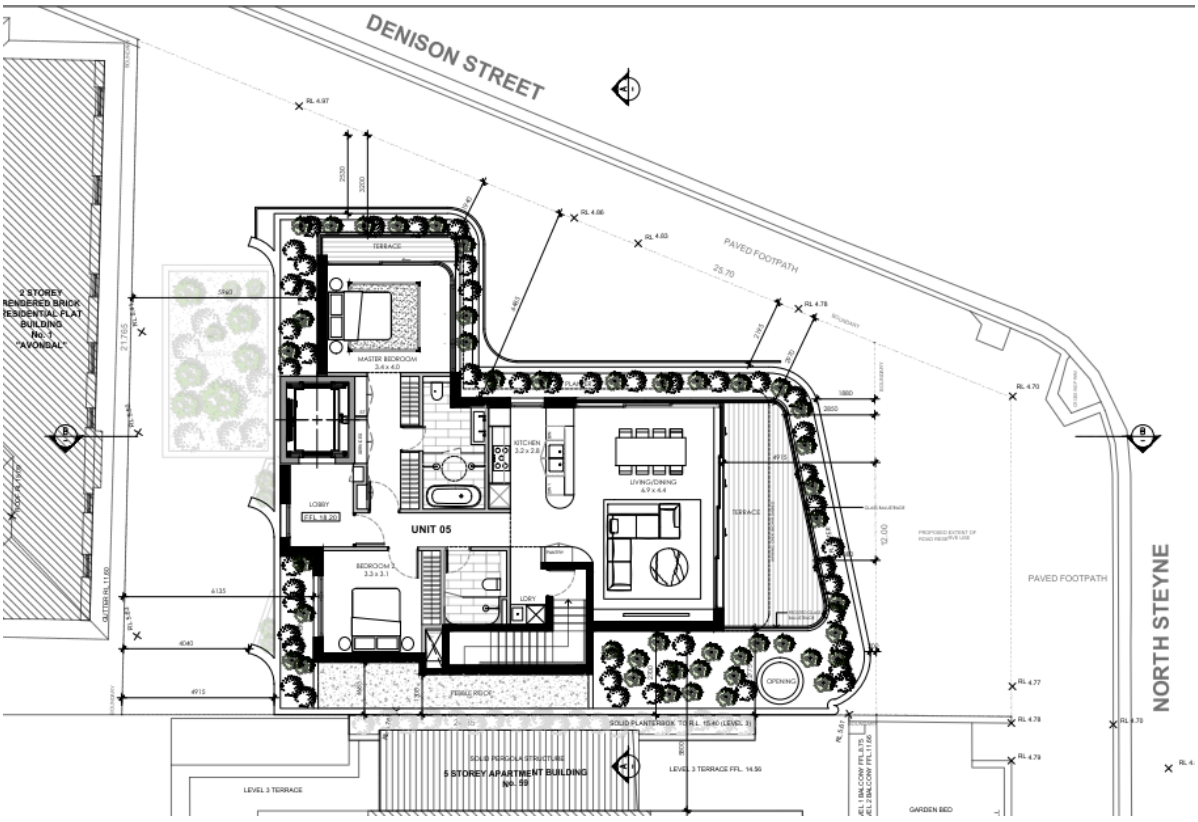

## Figure 4 Development Floorplan – Ground Floor



## Figure 5 Development Floorplan – Level 1-3




## Figure 6 Development Floorplan – Level 4



# 2 Ecologically Sustainable design

## 2.1 Definitions of Key Concepts

### 2.1.1 Ecologically Sustainable Development (ESD)

The concept of Ecologically Sustainable Development (ESD) was outlined in "Our Common Future", the report of the 1987 United Nations World Commission on the Environment and Development (the Brundtland Commission). It defined Sustainable Development as

*"Development that meets the needs of the present*
*without compromising the ability of future generation to meet their own needs".*

This concept was adopted within Australia in 1990 when the Council of Australian Governments endorsed a National Strategy for Ecologically Sustainable Development. The Commonwealth Government suggested the following definition for ESD in Australia:

*"Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased".*

Put more simply, ESD is development which aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations. To do this, it is necessary to develop ways of using those environmental resources which form the basis of our economy in a way which maintains and, where possible, improves their range, variety and quality.

The National Strategy for Ecologically Sustainable Development notes that there is no identifiable point where it can be said that ESD has been achieved. The strategy further states that there are two main features which distinguish an ecologically sustainable approach to development:

- We need to consider, in an integrated way, the wider economic, social and environmental implications of our decisions and actions for Australia, the international community and the biosphere; and
- We need to take a long-term rather than short-term view when taking those decisions and actions.

Ultimately ESD should lead to changes in our patterns of resource use, including improvements in the quality of our air, land and water, and in the development of new, environmentally friendly products and processes.

### 2.1.2 National Strategy for ESD Objectives and Guiding Principles

The National Strategy for ESD sets its core objectives as:

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations.
- To provide for equity within and between generations.
- To protect biological diversity and maintain essential ecological processes and life-support systems.

The Guiding Principles of the National Strategy for ESD are documented as:

- Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations.
- Where 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.
- The global dimension of environmental impacts of actions and policies should be recognised and considered.
- The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised.
- The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised.
- Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms.
- Decisions and actions should provide for broad community involvement on issues which affect them.

These guiding principles and core objectives need to be considered as a package. No objective or principle should predominate over the others. A balanced approach is required that takes into account all these objectives and principles to pursue the goal of ESD.

## 2.2 Specific Requirements for Compliance

Specifications for environmental design measures required for the proposed site are detailed in the following documents:

**Mandatory ESD Measures for Consideration**

- NSW Building Sustainability Index (BASIX) – Residential
- Manly Development Control Plan (DCP), 2013 Amendment 11
- The State Environmental Planning Policy (SEPP) 65 supported by the Residential Flat Design Code – Residential Component
- National Construction Code (NCC) 2019 Section J – Commercial
- The results for each BASIX category must meet the following minimum benchmark targets
    - Water Target: 40% (Achieved the baseline water target)
    - Energy Target: 35% (Achieved 40% - 5% in addition to the baseline water target)

The Northern beaches Council have been produced a sustainable design principal, energy efficiency and water conservation document, which covers ESD topics like energy efficiency, passive solar design, thermal mass, water conservation, etc. The document discusses important aspects of building design where there is the potential to increase the energy efficiency of a development during the Concept Design stages of a project by ecologically sustainable means. Note that many of the DCP topics are also addressed by BASIX and the NCC Section J.

The current study proposes Ecologically Sustainable Design (ESD) measure to improve upon the existing key sustainability elements of the proposed development and comply with the energy performance requirements of the Northern beaches Council DCP where possible.

# 3 ESD Initiatives for the Proposed Development

In order to achieve a structured integrated approach to ESD, a series of indicators and strategic goals have been identified at the outset to be communicated to the design team. SLR Consulting's role, as the project's ESD consultant, has been to apply these principles to all aspects of the development ensuring a best possible ESD outcome.

ESD indicators identified for the proposed Concept Plan are:

- Energy efficiency;
- Water conservation and management;
- Transportation;
- Management practices;
- Indoor environment quality;
- Materials;
- Land use and Ecology; and
- Emissions.

The ESD initiatives to be committed for the proposed development will be outlined in the subsequent sections of this report.

# 4 Passive Energy Efficiency

Passive energy efficiency refers to the choice of building materials, the placement of external facades and fenestration to effectively utilise solar energy for heating when required, and minimise solar gains when appropriate, thus 'passively' reducing the artificial heating and cooling requirements of the building. While high cooling and heating loads are typical in summer and winter months respectively, a good balance of heating and cooling load reduction techniques is required to produce a development with efficient passive design.

## 4.1 Site Analysis and Layout

A key ESD objective should be to optimise site conditions and minimise energy consumed for cooling and heating loads through proper selection of building orientation and internal layout. The following points are noted with respect to the sitting of the proposed development.

- The proposed development site will have immediate access to the beaches;
- The proposed development provides all units with access to daylighting;
- The proposed development provides good design to promote natural ventilation;
- The proposed development provides landscaped area and open space.

## 4.2 Solar Access – Residential Apartments

One of the objectives of energy conservation is to minimise the heating and cooling requirements of buildings. Sunlight should preferably be able to penetrate the building in winter and be excluded from the building in summer. The form dictated by the site has been designed to maximise the solar access of residential units by:

- Maximising solar exposure of every residential apartment. The height above ground of dwelling and units' layouts will allow excellent solar exposure from north, east and west directions to almost all apartments throughout the day, year-round. Exposure to solar will be provided via façade glazing to internal living areas.
- Ensuring that primary facade glazing is attached to all "living zone" rooms for all apartments (i.e. living room, bedrooms etc). With proper attention to design details (e.g. glazing seals), these rooms can act as highly efficient solar collectors especially during winter months.
- Living room glazing setback behind balconies with awnings above providing shielding from mid-summer sun exposure.
- Incorporating deep balconies to the east to reduce summer thermal loads on the residential units.
- Materials with high thermal mass will help to regulate temperatures year-round.

The State Environmental Planning Policy (SEPP) 65 supported by the Apartment Design Guide - Part 04 is relevant to the assessment of the daylight access into residential components of the developments in question. The above regulation states that:

- Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid-winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas.
- In all other areas, living rooms and private open spaces of at least 70% of the apartments in a building receive a minimum of 3 hours direct sunlight between 9 am and 3 pm at mid-winter.
- A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid-winter.

The ADG also outlines the following design guidance:

- To maximise the benefit to residents of direct sunlight within living rooms and private open spaces, a minimum of $1m^2$ of direct sunlight, measured at 1m above floor level is achieved for at least 15 minutes.

## 4.3 Natural Ventilation

Wind-induced natural ventilation works on the straightforward principle of differential pressure. If a building envelope has multiple openings and there exists a pressure difference between those openings, e.g. the wind pressure at one opening is greater than the pressure at the other opening, airflow will be pushed through the building in the direction positive to negative.

The most important role of natural ventilation in the context of the residential dwellings is to remove accumulated heat gain during periods of overheating. In this case, ventilation is intended to achieve predicted rates of volumetric air change. Also important during the summer months is the role of ventilation in directly improving the perception of thermal comfort by occupants of a space. This is achieved when moving air aids, the evaporation of perspiration by passing over the skin. As long as there is some air movement, most people will tolerate somewhat higher temperatures.

Heat build-up within dwellings through daytime summer temperatures can be quickly purged with the availability of suitable breezes at the site.

The Northern beaches Council DCP and the Apartment Design Guide encourages cross ventilation to be assisted by the building design. Building design should enable ventilation to be controlled, where comfort levels are maintained for the occupants during the summer and winter extremes. Locations of windows and openings within each dwelling are to be suitably in line where possible with each other on opposite sides of the room. It is recommended that building openings be designed such that cross-ventilation is maximized, minimizing heat gain in summer.

Ventilation of building is achieved by permanent openings, windows, doors, or other devices which have an aggregate opening or openable size of not less than 5% of the floor area of the ventilated room. The provision of ceiling fans for use in summer months is also encouraged.

In winter it is important to close off heated areas that need warming. The opportunity to open and close balcony doors will allow adequate control to moderate the impact of any higher than comfortable winds. It is recommended that the following initiatives also be incorporated to minimise heat leakage from the building:

- Design detailing of the glazing interface to the window framing system and the provision of adequate sealing in accordance with the Building Code of Australia (BCA).
- Doors leading to hallways, stairwells and non-common use areas provided with draught excluders to limit heat losses during winter months.
- Doors located throughout the development in general-use areas, such as access ways to/from the building, fitted with door closers where it is deemed that their opening will have an adverse effect on heat loss during winter.

ADG specifies the following rules of thumb:

- At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed.
- Building depth, which support natural ventilation typically range from 10 to 18 meters.

Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms.

## 4.4 Building Construction

### 4.4.1 Residential Building Materials

**Walls**

The proposed building will utilise light cladding system for the external walls. Insulation for the external walls has been assessed in accordance with NatHERS/BASIX requirements for residential apartment

The external wall will require additional R-Value for bulk insulation in line with the above guidelines. Apartments will “share” heat with their adjacent neighbours and so gain and lose less heat to the external environment.

**Roof**

SLR Consulting recommend bulk insulation blanket between the roof and ceiling to plant levels to reduce the heat gain/loss through the roofs. Insulation for the roofs has been assessed in accordance with NatHERS/BASIX.

**Glazing**

Performance Glazing, as required by the thermal comfort modelling, will reduce the solar heat gain on facades where low angle solar rays penetrate beneath shading devices.

Glazing has been assessed in accordance with NatHERS/BASIX. The primary glazing proposed throughout the site is a combination of double glaze low-E glass.

**Floor and Thermal Mass**

Concrete slab construction is recommended and has been proposed for all floors throughout the development - concrete has the highest thermal mass capacity amongst a range of common building products, as presented in **Table 1**.

Generally, more dense materials have higher mass which has the ability to store heat energy and then release it slowly to the room. This storage can effectively smooth out daily temperature variations within conditioned spaces, with corresponding reductions in both heating and cooling loads.

**Table 1 Indicative Thermal Mass Values of Some Common Building and Reference Materials**

| Material | Thickness (mm) | Thermal Mass ($kJ/m^2.K$) |
|---|---|---|
| Dolerite (Rock / Stone) | 200 | 433 |
| 10-31 Solid Brick | 190 | 410 |
| Concrete | 100 | 221 |
| Concrete block | 90 | 194 |
| 10.01 regular brick | 90 | 151 |
| Clay brick (3.5 kg solid + 0.5 kg mortar) | 110 | 142 |
| Aerated concrete block | 100 | 50 |
| Fibre cement sheet (compressed) | 18 | 32 |
| Wood flooring (hardwood) | 19 | 25 |
| Weatherboard (softwood) | 15 | 16 |
| Fibre cement sheet | 6 | 8 |
| Plasterboard | 10 | 8 |
| Glass | 3 | 6 |
| Expanded polystyrene (EPS-class SL) | 50 | 1.8 |
| Cork | 6 | 1.6 |
| Rockwool (batts) | 50 | 1.5 |
| Fibreglass (batts) | 50 | 0.5 |
| Air | 50 | 0.5 |

### 4.4.2 Building Sealing

The purpose of this subsection is to ensure that additional heating and cooling loads will not be introduced through building leakage.

A seal to restrict air infiltration must be fitted to each edge of an external door, operable external window or the like when serving a conditioned space in the proposed residential development. The seal may be a foam or rubber compressible strip, fibrous seal or the like.

The bathroom/toilet and laundry exhaust fans in the proposed development must be fitted with a sealing device such as a self-closing damper or the like.

## 4.5 Landscaping

The following points are noted with respect to the landscaping of the proposed development:

- The proposed landscape plan (refer Error! Reference source not found.) shows trees around perimeters on ground level to level 4. The use of trees and perimeter planting for shading help reduce the reflection of heat and light onto the building from surrounding paved areas. Planting also provides added cooling during the summer months through the leaf transpiration process.
- Most of the trees provided to the perimeter of the site will be evergreen trees, providing year-round wind, heat and solar mitigation.
- There is a combined 110.8 $m^2$ of vegetation and garden, with approximately 36% of the plant species to be provided deemed indigenous.

**Figure 7 Ground Level Landscaping**

# 5 Active Energy Efficiency

Active energy efficiency is achieved by putting in place energy efficient electrical items such as air-conditions systems, artificial lighting to reduce the energy usage of the building.

## 5.1 Residential Component

In NSW, all new residential development proposals are required to achieve a 'PASS' in the Thermal Comfort component of the BASIX rating scheme. When the areas of the apartments are input into BASIX, the maximum heating and cooling loads for the apartment and the overall development will be calculated. Each individual apartment and the overall development are to achieve annual heating and cooling loads of NatHERS climate zone 56 not more than the stated maximum load figures:

- Maximum annual heating load of 45.4 MJ/$m^2$
- Maximum annual cooling load of 29.5 MJ/$m^2$

With the recommendations contained within this report we find that the proposed development can achieve the relevant BASIX compliance ratings, results of SLR assessment are summarised as follows:

- Water efficiency of 40 (achieving the target of 40).
- Energy Efficiency of 40 (exceeding the target of 35).
- The proposed residential development will enjoy a high level of thermal comfort gaining a NatHERS/BERSPro star rating of 7.2 Star.

## 5.2 Domestic Hot Water (DHW)

As natural gas is abundant and more energy efficient than electricity, gas is recommended for hot water in NSW. The sole use of electricity as the energy source for conventional electric water heaters is inefficient because electricity is a secondary source, deriving its energy after burning coal. As coal-based systems require expensive handling equipment and specialised pollution control systems, gas water systems are more energy efficient.

The NCC specifies the thermal efficiency for hot water systems to be at least 80%. Solar – electric boosted central hot water systems have been proposed to serve the hot water needs of the proposed development.

With the installation of water efficient fixture, the hot water consumption will be decreased and thus the domestic hot water usage will also decrease. Therefore, there will be less energy consumption for DHW.

## 5.3 Lighting

### 5.3.1 Natural Lighting

The proposed design will be implementing large glazing areas particularly to the northern and eastern facades, allowing for natural daylight access and therefore minimising the use of artificial lighting.

### 5.3.2 Artificial Lighting

Household lighting energy use in Australia is increasing due to the construction of larger homes and the installation of more light fittings per home. It is estimated that most homes could readily reduce the amount of energy they use for lighting by 50% or more.

Lighting installations require a design that properly considers the conservation of scarce energy resources. Sustainable lighting design ensures that illuminance is not excessive, that the switching arrangements are such that unnecessary illumination may be turned off and that the illumination is provided in an efficient manner.

There are additional energy losses associated with inefficient lamps and lighting losses associated with luminaries. Consequently, a lighting design which uses the more efficient lamp types and the least number of luminaries for a given design illuminance will be more efficient and usually have a lower capital cost.

Lighting to be used within the development will incorporate LED lightings. It is recommended that the following lighting features be incorporated into the development to minimise energy consumption due to lighting:

- Maximise use of compact fluorescents/LED Lights and minimise or where possible eliminate the use of halogen down lights, as compact fluorescents are much more efficient than halogen lighting.
- Light switches to be located at room exits to encourage switching lights off when leaving a room. Separate switches to be installed for special purpose lighting.

Under the NCC there is a requirement for the proposed building that the artificial lighting must not exceed the maximum lamp power density in **Table 2,** except that in a bathroom, dressing rooms or the like, an average artificial *light source efficacy* of not less than 40 Lumens/W may be used.

**Table 2 Maximum Lamp Power Density**

| Location | Maximum Lamp Power Density ($W/m^2$) |
|---|---|
| Board room and conference room | 5 |
| Carpark - general | 5 |
| Carpark - entry zone (first 20 m of travel) during night-time | 2.5 |
| Control room, switch room and the like | 3 |
| Corridors | 5 |
| Entry lobby from outside the building | 9 |
| Kitchen and food preparation area | 4 |
| Office - artificially lit to an ambient level of less than 200 lx | 2.5 |
| Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms | 4 |
| Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks | 14 |

| | |
|---|---|
| Retail space including a museum and gallery whose purpose is the sale of objects | 14 |
| Sole occupancy unit of a Class 3 building | 5 |
| Service areas such as cleaner's room and the like | 1.5 |
| Toilet, locker room, staff room, rest room | 3 |
| Wholesale storage and display area | 4 |

The maximum illuminance power density may be increased by multiplying by any adjustment factor provided in NCC Table J6.2b which provides adjustment factors based on methods of controlling the lighting systems, such as motion detectors, dimming systems and room properties.

SLR recommends that the development target illuminance values that are 10% less than those put forward within the NCC.

## 5.4 Mechanical Ventilation

Where mechanical ventilation is required, the use of energy efficiency measures will be fully explored during detailed design. These measures include linking mechanical ventilation to manual switching where allowable under the BCA and using individual fans rather than a common ducted ventilation system with constant operation. These initiatives will provide significant savings in energy use and associated operational energy costs of the development.

SLR Consulting recommends using minimum 4-star energy efficient air conditioning systems for both heating and cooling.

Single-phase air conditioning units will be installed to residential apartments. It is recommended that the installed systems have a star rating of 4 or higher.

## 5.5 Renewable Energy

As the worldwide demand for fuel increases, alternative and renewable energy sources are emerging as economical and sustainable options. Alternative renewable energy sources are becoming more attractive options because of increased global demand for fuels, environmental responsibility, affordability, and new local, state, and federal government legislations.

It is encouraged for the proposed development to install renewable energy such as solar panels on site to reduce greenhouse gas emission.

SLR consulting recommends conducting a detailed renewable energy efficiency study for the proposed site during the detailed design stage.

## 5.6 Indoor Environmental Quality

Achieving enhanced Indoor Environment Quality (IEQ) ensures that the building and building services are designed and managed to benefit the health and well-being of building occupants and visitors.

### 5.6.1 Asbestos

It is recommended that Asbestos identification and removal procedures be included in the site Environmental Management Plan (EMP) where required.

### 5.6.2 Internal Noise Levels

Internal noise levels are a significant factor in determining occupant and customer satisfaction and well-being. The aim of controlling internal noise levels is to encourage and recognise buildings that are designed to maintain internal noise levels at an appropriate level.

SLR Consulting recommends that all future development in the proposed site meet the recommended criteria and measures provided in accordance with the relevant National Construction Code (NCC) requirements.

### 5.6.3 Carbon Dioxide Monitoring and Control

Elevated carbon dioxide ($CO_2$) levels are indicative of inadequate ventilation, affecting the quality of air within an enclosed occupied space, and the health of the occupants. $CO_2$ monitoring systems can detect elevated concentrations of $CO_2$ and automatically adjust ventilation supply rates before indoor air quality becomes problematic.

SLR Consulting recommends incorporating a $CO_2$ monitoring system where appropriate to satisfy NCC requirements.

# 6 Water

Australians use more than one million litres of freshwater per person each year (*source:* Green Building Council of Australia 2006).

In addition to increased water use efficiency, new developments can reduce potable water demand by, occupants and visitors through the provision of an on-site alternative water supply. There are three principle forms of alternative water supply:

- Reticulation of reclaimed water to the site.
- Rainwater/storm water storage and reuse.
- Grey water storage and reuse.

The above water supply systems can be used for toilet flushing, landscape irrigation and fire services, reducing the demand on potable water supply.

## 6.1 Water Efficiency

The minimum sustainable standard for water efficient water fixtures and fittings is 3A. To achieve greater than the standard level, the development will consider installing water efficient fixtures and fittings such as:

- 4 star all toilet flushing system

- 4 star flow tapware
- 4 star showerhead ( > 4.5 but <= 7.5L/min)

The above measures are currently considered to be good practice in sustainable building design. Implementation of the above recommendations will assist in reducing the water consumption.

## 6.2 Landscape Irrigation

Under international best practice guidelines, it is generally recommended that either 90% of the water requirement for landscape irrigation is sourced from on-site rainwater collection or recycled water. Alternatively, best practice would also be achieved with the installation of a water efficient irrigation system comprising subsoil drip systems and automatic timers with rainwater or soil moisture sensor control override.

The landscape design should focus on using native and other drought resistant species, these rely primarily on rainwater for their water needs.

# 7 Transport

When designing a sustainable development, it is important to minimise the use of individual motorised transport where possible and thus enhance energy savings and environmental impact through reduced fossil fuel consumption and improved regional air quality. This can be achieved by encouraging the use of energy efficient public transport that is immediately at hand, providing facilities for electric vehicle charging, car sharing schemes, reducing car parking facilities and providing adequate bike storage facilities to minimise the requirement for individual motorised transport.

## 7.1 Provision of Car Parking

Transport emissions are one of the largest contributors of greenhouse gas emissions in Australia. The Green Building Council of Australia (GBCA) encourages the utilisation of alternative and mass transit forms of transport by limiting the availability of private vehicle spaces.

SLR consulting recommends providing car spaces for low emission or alternative fuel vehicles such as electrical cars; and car-sharing scheme.

## 7.2 Provision of Facilities for Non-Motorised Transport

Bicycle storage facilities have been proposed to each level of the provided basement car parking, with separate storage spaces outlined to the basement lobbies for each level on the provided plans.

### 7.2.1 Facilitation of Pedestrian and Non-Motorised Transport

When designing a sustainable development, it is important to minimise the use of individual motorised transport where possible and thus enhance energy savings and reduce environmental impact through reduced fossil fuel consumption and improved regional air quality. This can be achieved by encouraging all users of the development to make use of the energy efficient public transport that is immediately at hand.

Bike storage facilities should be installed in the proposed development, which will also help to minimise the requirement for individual motorised transport.

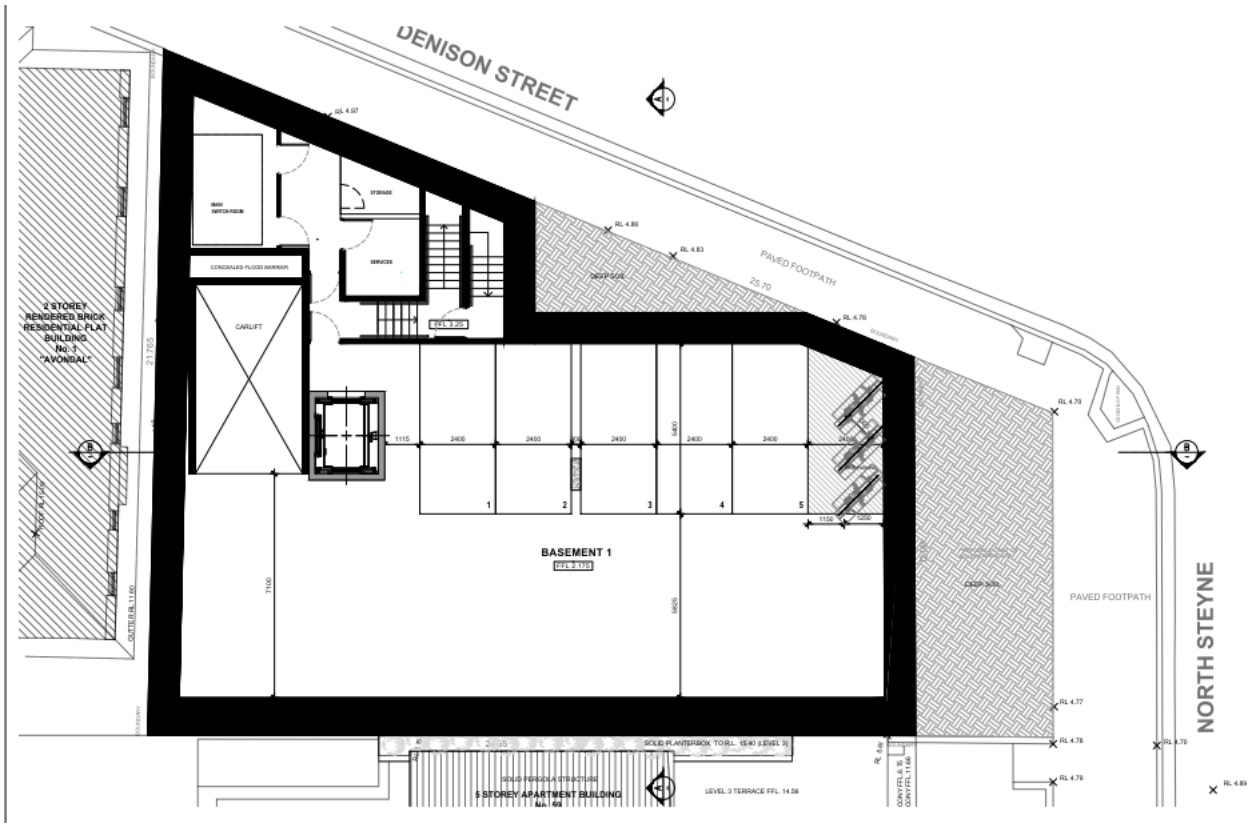
Sufficient recreational opportunities are easily accessible to occupants, eliminating the requirement for long-distance motorised transport for most recreational activities. This would be a positive feature of the development with regards to sustainability as this clearly avoids greenhouse gas emissions that would otherwise have been produced if residents had to travel long distances for recreational activities.

Storage spaces and Bicycle parking for the development are to be provided at rates meeting the requirements of Manly DCP 2013.

shows provision of bicycle storage and parking in basements.

The provision of bicycle storage spaces within the development, although not a requirement of BASIX, will ensure the development become a more sustainable development in a holistic sense.

**Figure 8 Bicycle Storage Space**




## 7.3 Commuting Using Public Transport

Developments that are within close proximity of good transport nodes with frequent service should be encouraged.

The proposed development can provide easy access to nearby transport - ferry wharf. Additional access to buses provides transportation options for building occupants. The proposed development will encourage occupants and users of the development to use public transportation and minimise automobile use.

# 8 Management

Building management helps to reduce greenhouse gas emissions and energy consumption through adequate commissioning and user guides. It is also to reduce environmental impact during construction activities. The Management category is discussed in the Green Building Council of Australia which encourages the following practices. Note that the green Star rating tool is not mandatory and the following initiatives suggested have been included as opportunities for the Project Team to adopt ESD initiatives during the DA stage of the project:

- Having at least one ESD Professional on the design team;
- Improving building services performance and energy efficiency by incorporating comprehensive pre-commissioning, commissioning, and quality monitoring into a project;
- Building tuning period of 12 months. This ensures that the time and cost of building tuning is accounted for during the design phase. A 12 month building tuning period also incorporates quarterly reviews and a final recommissioning;
- Providing Building User's Guides to provide information on the design features and ensure that they are used efficiently; and
- Providing a comprehensive Environmental Management Plan (EMP) for the works in accordance with Section 4 of the NSW Environmental Management System Guidelines (1998).

SLR Consulting recommend incorporate the above initiatives where appropriate and possible.

# 9 Operational Waste Management

A Waste and Recycling Management Plan for the demolition, construction and operation of the building is a minimum requirement to meet sustainable building design best practice. As a guideline, the Waste and Recycling Management Plan should include:

- Separate waste and recycling streams.
- Transfer of material to common storage area.
- Communal storage areas.
- Frequency of collection.
- Signage and educational initiatives for occupants.

The proposed development has been provided with an operational waste management plan in accordance with The Northern Beaches Council requirements. The report outlines measures in line with the above requirements, along with more best practice measures to be considered for the site.

Measures outlining convenient waste and recycling collection rooms have been provided within the report, additional recommendation for recycling bins in addition to waste bins to be provided to communal areas will decrease the waste impact of the site.

Recommendations have been put forward that outline effective education material and appropriate signage relating to waste and recycling be provided to residents and site occupants.

# 10 Conclusions

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Lindsay Bennelong Developments to prepare a Sustainability Management Plan (SMP) for the proposed development at 61 North Steyne, Manly.

This study has been prepared in accordance with the Northern beaches Council DCP 2013, 2019 National Construction Code (NCC) and the Building Sustainability Index (BASIX).

The site is located at beachfront long Manly Beachfront, conveniently minutes' walk to recreational opportunities including parks, shops, gyms, sports facilities etc. Access to these facilities reduces the requirement for long-distance motorised transport for most recreational activities. This would be a positive feature of the development with regards to sustainability as this clearly avoids greenhouse gas emissions that would otherwise have been produced if residents had to travel long distances for recreational activity.

The site location can also provide easy access to nearby transport - ferry wharf. Additional access to buses provides transportation options for building occupants. The proposed development will encourage occupants and users of the development to use public transportation and minimise automobile use.

The proposed development will incorporate passive and active energy saving measures to enhance building operating performance where appropriate. Overall, positive Ecologically Sustainable Design (ESD) and energy efficiency features are currently in a few design areas, incorporating the following:

- The form dictated by the site has been designed to maximise the solar access of residential units;
    - The living rooms and private open spaces of the proposed apartments will receive a minimum of 2 hours direct sunlight on the Winter Solstice between 9 am and 3 pm.
- The proposed development will incorporate passive and active energy saving measures such as operable windows to enhance natural ventilation through serviced apartments, where appropriate;
    - The proposed residential units will be naturally cross ventilated.
- Incorporation of high thermal mass;
- Provision of 5 kW PV solar system;
- Consideration of a solar – electric boosted hot water system;
- Car park ventilation system to be provided with Variable Speed Drives (VSD's) and CO monitoring;
- Landscaped elements to feature to building car lift rooftop areas to increase green spaces;
- Provision of native landscaping;
- Separate tenancy metering;
- Appropriate glazing selection in accordance with BASIX to cut excess solar heat gains for apartments;
- Provision of end of trip facilities for bicycles and other alternate transportation;
- Provision of parking for small or alternate vehicles, such as motorbikes;

The following recommendations have been made to improve upon the existing key sustainability features:

- Water efficient bathroom and kitchen fittings;
    - 4 star all toilet flushing system;

  - 4 star flow tapware;
  - 4 star shower head (> 4.5 but <= 7.5L/min);
- Minimum 3.5-star water efficient and minimum 3.5-star energy efficient dishwashers and clothes washers; and

Recommendations regarding the mechanical ventilation system, lighting control, building fabric requirements, domestic hot water, other appliance and operational waste etc, have also been made within the body of the report. These features will help to achieve significant reductions in the energy and water required by the development from construction and operation.

With the acknowledgements and recommendations contained within this report we find that the proposed development can achieve outcomes that comfortably exceed relevant BASIX certificate ratings:

- The proposed residential development will enjoy a high level of thermal comfort gaining an average 7.2 NatHERS star rating.
- The project will achieve a water section score of 40 (BASIX requirement: 40)
- The project will achieve an energy section score of 40 (BASIX requirement: 35)

It is recommended that ESD initiatives continue to be developed and implemented during the detailed design stage of the project.

# 11 Closure

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Lindsay Bennelong Developments. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR Consulting.

SLR Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

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