



173–179 Walker Street & 11–17 Hampden St, North Sydney

Ecologically Sustainable Design Assessment

East Walker 88 Development Pty Ltd

Prepared by:

SLR Consulting Australia

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Revision Record

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Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with East Walker 88 Development Pty Ltd (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.



Executive Summary

SLR Consulting Australia Pty Ltd (SLR) has been engaged by East Walker 88 Development Pty Ltd (the Applicant) to provide a qualitative Ecologically Sustainable Design (ESD) assessment for the residential development located at 173–179 Walker Street & 11–17 Hampden St, North Sydney.

The development is located on Walker Street and Hampden Street adjacent to the Warringah Freeway within the North Sydney local government area. It occupies a highly accessible and sustainable location, benefiting from proximity to a wide range of local amenities and facilities, and is situated near Victoria Cross Station and Metro.

In accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs) and in support of the State Significant Development Application (SSD-67175465), this study has been prepared to respond to the SEARs requirements issued pertaining to Ecologically Sustainable Design (ESD).

This study has also been prepared in accordance with the National Construction Code (NCC) 2022 Section J, North Sydney DCP & LEP, the NSW Building Sustainability Index (BASIX), NSW Apartment Design Guidelines, State Environmental Planning Policy (Sustainable Buildings) 2022 and the ESD principles as defined in section 193 of the EP&A Regulation.

A detailed response to associated SEARs requirements is summarised in the table below.

Table 1 SEARs ESD Requirements and Responses

Item for inclusion	Action and Report Location
1. Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.	Section 3 details how ESD principles as defined in clause 7 (4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (reproduced in Clause 193 of the 2022 revision of the regulation) and up to date legislation are being incorporated in the design, construction, and operation phases of the project. In terms of Precautionary Principle, the project does not present threat of serious or irreversible environmental damage. The project conducted all required environmental studies and incorporated adaptability and resilience measures in the design. Inter-generational equity, the health, diversity and productivity of the environment are enhanced for the benefit of future generations via a number of initiatives including large PV solar installation, sustainable materials, reduced waste, reduced heat islands, etc. Refer Section 3 for all other initiatives.



Item for inclusion	Action and Report Location
	From a conservation of biological diversity and ecological integrity perspective, the project satisfies all environmental and statutory provisions requirements and will maintain the existing ecological structures (species and ecosystems, etc) for the site and provide additional native vegetation planting and reduced stormwater runoff the site. Environmental goals have been established and achieved using recognised rating tools. A Quantity Surveyor (QS) will be engaged to ensure that the project will remain on budget and all sustainability measures in the current study are implemented. The ESD initiatives will help to achieve significant reductions in the energy, waste and water required by the development both in building and operation and will deliver improved valuation and beneficial outcome.
2. Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	Section 3 details how the project exceeds relevant industry recognised building sustainability and environmental performance standards through the implementation of best practice design principles and a wide range of ESD initiatives including renewable energy to offset the site energy use and reduce peak demand on electricity supply infrastructure.
3. Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	The residential development will exceed an average 7 NatHERS star rating and also to exceed the required BASIX Water targets. The development is targeting to achieve net-zero emissions compliance.

The development includes many ecologically sustainable design features. This report provides an overview of these features.



The following ESD and energy efficiency features are included in the design:

- The development will incorporate passive design measures such as operable windows with high performance glazing and integral shading through articulation to limit solar heat ingress and enhance natural ventilation through the apartments, to provide passive cooling where appropriate;
 - 80.8% (193 out of 239) of the residential units are naturally cross-ventilated. (Minimum required 60%)
- The form dictated by the site has been designed to maximise the solar access of residential units for passive solar heating in winter;
 - 72.8% (174 out of 239) of apartments will achieve 2 hours solar access across the assessment window. (Minimum required 70%)
- Thermally insulated high mass constructions - Concrete slab construction is incorporated for all floors throughout the development - concrete has amongst the highest thermal mass capacity of a range of common building products. The development's external walls, structural internal walls, and slabs will be predominantly high thermal mass materials incorporating insulated constructions as required to meet all applicable NCC Section J and NatHERS requirements;
- Active energy efficiency design measures and all electric building services;
- LED energy-efficient lighting for all spaces;
- Light efficiency measures in the carpark and common areas using a combination of manual controls, time clock and motion sensors as appropriate;
- Gearless traction with variable voltage variable frequency (VVVF) motor lifts;
- Centralised energy-efficient electric air sourced heat pump hot water system with minimum efficiency of $(3.5 < \text{COP} \leq 4.0)$;
- Individual 1-phase air-conditioning systems of $\text{EER} > 3.0$ for heating and cooling of all dwelling unit living areas of Building A.
- Central air conditioning air cooled chilled water system achieving a $\text{COP} < 3.5$ for cooling of all dwelling units of Building B.
- For conditioned common areas, high efficiency air conditioning systems complying with Section J requirements;
- Energy efficient dishwashers of 4 star (4.5 star to specific units as per BASIX);
- Energy efficient clothes dryers of 8 star (10 star to specific units as per BASIX);
- Provision of electric induction cooktop and electric oven within each residential dwelling;
- Sub-metering to enable continued review of power and water consumption;
- Selection of endemic and low-maintenance landscaping species;
- Water efficient bathroom and kitchen fittings;
 - All residential kitchen and bathroom taps are 4-star;
 - All residential shower heads are 3.0 Stars (>7.5 but $\leq 9\text{L/min}$).
 - All residential toilet flushing systems are 4-star;
 - Residential dishwashers to have a minimum 4-star water efficiency rating;



- Residential clothes washers to have a minimum 4-star water efficiency rating;
 - All common area hydraulic fixtures (as applicable) have a minimum 4-star water efficiency rating;
- In addition, the project proposes a rainwater harvesting system with a tank storage capacity of 10 kL for reuse in irrigation and washdown;
- Low levels of volatile organic compounds (VOC) paints and floor coverings and low formaldehyde wood products where possible;
- Use of materials with high SRI values for roofing and terrace pavements.
- The project is committed to provision for future installation of EV chargers in 100% of charging spaces.
- The provision of bicycle storage spaces within the development will support the use of low emission transportation opportunities by the users and occupants;
- Planting provides added cooling during the summer months through the leaf transpiration process and is also useful for wind amelioration;
- Plant species within the development would be predominantly indigenous species that can tolerate low water to reduce maintenance requirements;
- The installation of roof-mounted solar PV systems.
 - 48 kW PV solar systems are proposed to reduce greenhouse gas emissions.
 - 48 kW PV solar systems are indicated to offset approximately 67.2 MWh/year of energy usage.
 - The estimated greenhouse gas CO₂ emission saving is approximately 45 t.CO₂/annum.
- The residential development will enjoy a high level of thermal comfort exceeding an average 7 NatHERS star rating;
- The residential development also meets BASIX targets in Energy and exceeds BASIX targets in Water.

The report body contains commitments with regard to other ESD features, such as materials, mechanical ventilation system, other appliances, and operational waste. These features are incorporated in the design to help achieve significant reductions in energy, water and resources required by the development both in building and operation, in addition to ensuring that the common areas and residential units are pleasant spaces to occupy.

It is proposed that the committed ESD initiatives continue to be developed and implemented as required, and the sustainability benchmarks are met as the design of the building and services are finalised for construction.

In addition, the development is targeting to achieve net-zero emissions compliance.



Table of Contents

1.0 Introduction	1
1.1 Site Description	1
1.2 Development Description	2
2.0 Ecologically Sustainable Design.....	4
2.1 Specific Requirements for Compliance.....	5
2.1.1 Mandatory ESD Measures for Consideration.....	5
3.0 ESD Initiatives Considered for the Development.....	7
3.1 Passive Design Features.....	7
3.1.1 Site Analysis and Layout	7
3.1.2 Solar Access	7
3.1.3 Natural Ventilation	9
3.2 Landscaping	10
3.3 Building Construction	11
3.3.1 Building Materials	11
3.3.2 Building Sealing.....	12
3.3.3 Heat Island Effect Mitigation	12
3.4 Active Energy Efficiency.....	13
3.4.1 Mechanical Ventilation and Air Conditioning.....	13
3.4.2 Hot Water	14
3.4.3 Lifts	14
3.4.4 Lighting	14
3.4.5 Appliances.....	14
3.4.6 PV Solar Green Initiatives	15
3.4.7 Electrification and Green Power Initiative	15
3.5 Water	16
3.5.1 Water Efficiency	16
3.5.2 Landscape Irrigation.....	17
3.6 Walker.....	17
3.7 Transport.....	17
3.7.1 Commuting Using Public Transport	18
3.7.2 Facilitation of Pedestrian and Non-motorised Transport	18
3.7.3 Provision of Car Parking.....	18
3.8 Indoor Environmental Quality	19
3.8.1 Asbestos	19



3.8.2 Internal Noise Levels	19
3.8.3 Carbon Monoxide Monitoring and Control	19
3.8.4 Low Emission Materials	19
3.9 Operational Waste Management	19
4.0 Conclusion.....	21

Tables in Text

Table 1 SEARs ESD Requirements and Responses	ii
Table 2 Indicative Thermal Mass Values of Various Materials	12

Figures in Text

Figure 1 Site Location	1
Figure 2 Ground Floor Plan	3
Figure 3 Architectural Solar Access Summary	9
Figure 4 Architectural Cross Ventilation Summary	10
Figure 5 Pavements with High SRI Materials	13
Figure 6 PV Solar on Roof	15
Figure 7 Public Transport Infrastructure around the Project Site	17
Figure 8 EV Charging Infrastructure	18
Figure 9 Basement 01 Plan Showing Waste Management Facilities.....	20



1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by East Walker 88 Development Pty Ltd (the Applicant) to provide a qualitative Ecologically Sustainable Design (ESD) assessment for the residential development located at 173–179 Walker Street & 11–17 Hampden St, North Sydney.

The ESD report has been prepared in a standard form considering the following aspects of the development.

- Identify how ESD principles are incorporated in the design and ongoing operation of the development.
- Demonstrate how the development is proposed to meet or exceed the relevant industry-recognised building sustainability and environmental performance standards.

The initiatives suggested throughout this report have been included as opportunities for the project team to adopt ESD initiatives that provide both direct and indirect benefits to the development.

1.1 Site Description

The proposed development is located on Walker Street and Hampden Street adjacent to the Warringah Freeway within the North Sydney local government area. It occupies a highly accessible and sustainable location, benefiting from proximity to a wide range of local amenities and facilities, and is situated near Victoria Cross Station and Metro.

Figure 1 Site Location

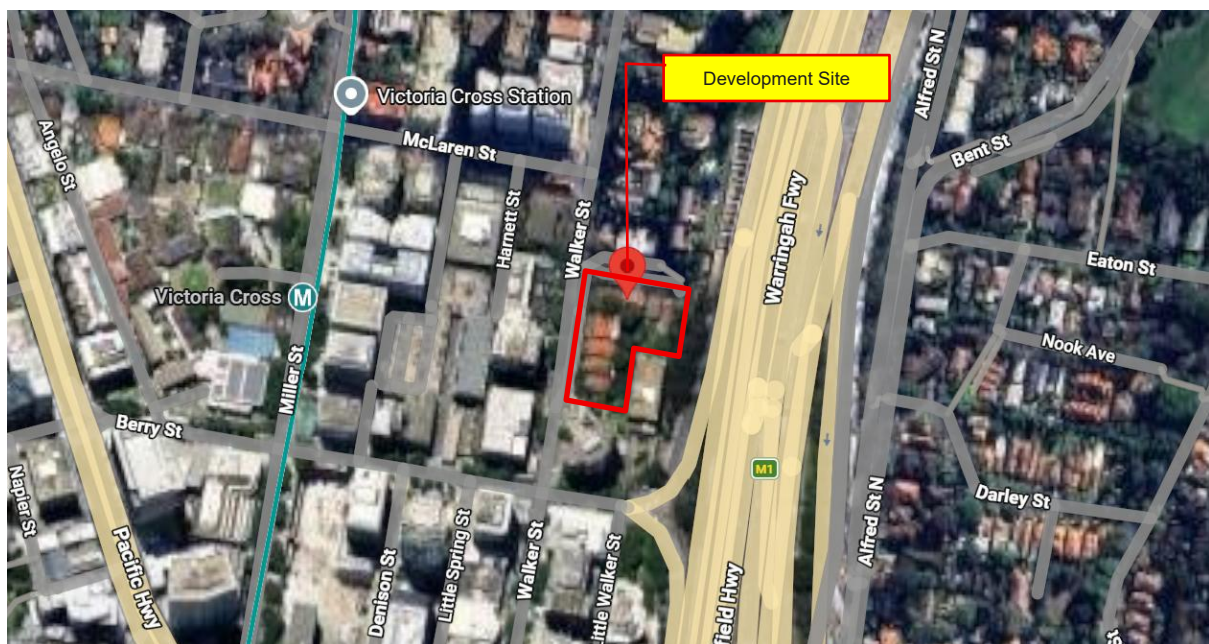


Image: Courtesy Google Maps 2026



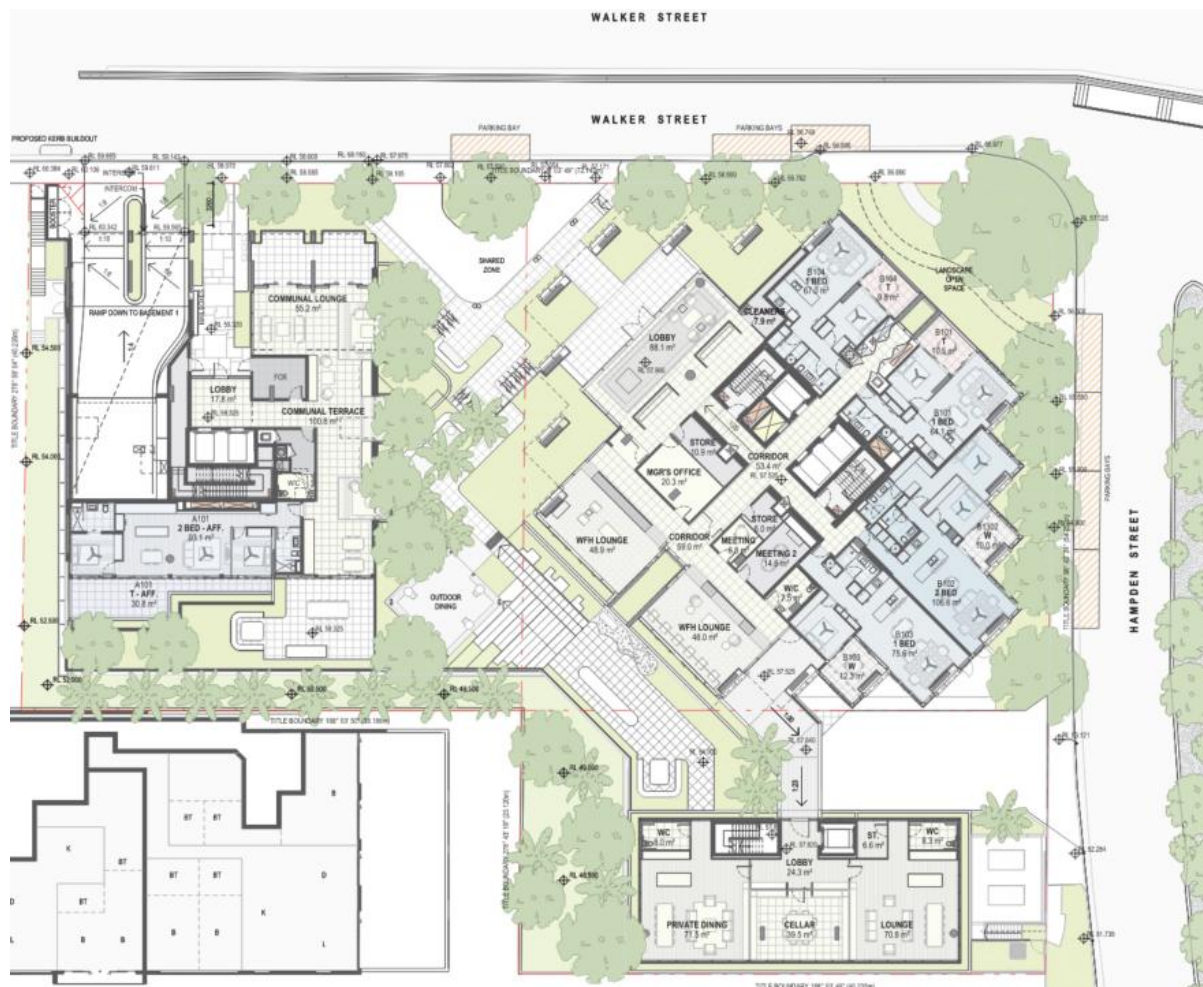
1.2 Development Description

The purpose of the SSDA is to redevelop the Site under the NSW Governments amended State Environmental Planning Policy (Housing) 2021 (Housing SEPP) issued on 14 December 2023 and deliver a mix of market build-to-sell and affordable housing residences. Specifically, the SSDA sought development consent for:

- Site establishment and enabling works including:
 - Stormwater diversion
 - Sewer diversion
 - Lower Walker Street footpath and Hampden Street kerb and gutter modifications as required to accommodate service diversions.
 - Removal of all trees and existing vegetation on the Site.
 - Demolition of all existing structures on the Site.
 - Disconnect and make-safe of existing services.
- Excavation and ground works including retention, bulk excavation and in ground services works.
- Building A - Construction of a 12-storey residential flat building containing affordable housing, comprised of:
 - 67 affordable housing dwellings required by the Housing SEPP
 - 11 affordable housing dwellings required by the planning agreement that applies to the Site
 - Ground floor communal recreation
- Building B1 – Construction of a 30-storey residential flat building containing market build-to-sell dwellings, comprised of:
 - 161 market build-to-sell dwellings
- Building B2 – Construction of a 4-storey ancillary residential building serving Building B1, containing:
 - Associated B1 services
 - Communal recreation for B1
- Construction of a 4-level shared basement, with primary vehicular access for residents and visitors from lower Walker Street and secondary vehicular access to the loading dock from lower Hampden Street. The basement will accommodate:
 - 218 car parking spaces for residents
 - 2 loading bays
 - 22 motorbike / scooter spaces.
 - 239 bicycle spaces for residents and 24 visitor spaces (263 total).
 - 239 storage cages.
 - Residential waste storage areas for Building A, B1 and B2.
 - Associated plant, utilities, and servicing.
- Construction of a port cochere on lower Walker Street to service the Site.



- ### Figure 2 Ground Floor Plan



2.0 Ecologically Sustainable Design

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 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.

National Strategy for ESD Objectives and Guiding Principles are elaborated below.

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 considers all these objectives and principles to pursue the goal of ESD.

2.1 Specific Requirements for Compliance

Specifications for environmental design measures required for the site are detailed below:

2.1.1 Mandatory ESD Measures for Consideration

- National Construction Code 2022 – Section J requirements
- BASIX Certification for the Residential Component.
- North Sydney Development Control Plan 2025
- North Sydney Local Environmental Plan 2013
- The Planning Secretary's Environmental Assessment Requirements (SEARs) for State Significant Development Application (SSDA) (SSD- 86182458) ESD requirements:

- Identify how ESD principles (as defined in Section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.

The principles of ESD in accordance with Section 193 of the EP&A Regulation, are defined in this NSW legislation as follows:

- (a) *the precautionary principle,*
- (b) *inter-generational equity,*
- (c) *conservation of biological diversity and ecological integrity,*
- (d) *improved valuation, pricing and incentive mechanisms.*

These principles are further paraphrased and elaborated in Section 2.0 above.

- Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.
- Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and materials resources.
- The State Environmental Planning Policy (SEPP) Sustainable Buildings:
 - Residential spaces should satisfy the following -



- the embodied emissions attributable to the development have been quantified.
- Apartment Design Guidelines for residential areas
 - 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 acknowledges that achieving the above design criteria may not be possible on some sites. This includes:
 - Where greater residential amenity can be achieved along a busy road or rail line by orientating the living rooms away from the noise source.
 - On south facing sloping sites
 - Where significant views are orientated away from the desired aspect for direct sunlight.
 - 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.

The following section elaborates on how the above requirements are captured in the design and how the project responds to these controls.



3.0 ESD Initiatives Considered for the 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, as the project's ESD consultant, has applied these principles to all aspects of the development ensuring a best possible ESD outcome.

ESD indicators identified for the project are:

- Passive design features
- Landscaping
- Building construction
- Active energy efficiency
- Water
- Transport
- Indoor environmental quality
- Operational waste management
- Renewable energy options

The following sections below outline the ESD initiatives to be committed for the development.

3.1 Passive Design Features

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 facilitate a development with efficient passive design.

3.1.1 Site Analysis and Layout

A key 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 siting of the development.

- As opposed to new developments on the outer fringes of the city which require significant investment in new roads, sewerage, lighting and power the development site will have immediate access to all of these;
- The development provides a large number of units with access to daylighting;
- The development provides good design to promote natural ventilation;

3.1.2 Solar Access

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 and units' layouts will allow excellent solar exposure from at least 2 directions to the majority of the apartments throughout the day, year-round.
- 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.
- Incorporating deep balconies to reduce summer thermal loads on the residential units.

The Apartment Design Guide - Part 04 is relevant to the assessment of the daylight access into residential components of the project. The above guide 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 acknowledges that achieving the above design criteria may not be possible on some sites. This includes:

- Where greater residential amenity can be achieved along a busy road or rail line by orientating the living rooms away from the noise source.
- On south facing sloping sites
- Where significant views are orientated away from the desired aspect for direct sunlight.

The form dictated by the site has been designed to maximise the solar access of residential units.

The development has been assessed by the project Architect for solar access to the site between 9.00 am and 3.00 pm on the winter solstice. The following conclusions have been reached from the solar access study:

- 72.8% (174 out of 239) of apartments will achieve 2 hours solar access across the assessment window. (Minimum required 70%)
- Less than 10% (17 out of 239) of apartments will achieve 0 hours solar access across the assessment window. (Maximum required 15%)



Figure 3 Architectural Solar Access Summary

Total Solar Compliance	72.8% Dwellings - 174 Units
Building A Solar Compliance	70.5% Dwellings - 55 Units
Building B Solar Compliance	73.9% Dwellings - 119 Units
Total Units with No Sun	10.0% Dwellings - 17 Units
Building A Units with No Sun	0% Dwellings - 0 Units
Building B Units with No Sun	14.9% Dwellings - 17 Units

3.1.3 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 openings; airflow will be pushed through the building in the direction positive to negative.

The resulting amount of airflow through the building envelope will be a function of the magnitude of the pressure differential, size of the various building openings and degree of “blockage” in between.

3.1.3.1 Residential Apartments

The most important role of natural ventilation in the context of the residential apartments 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. If there is some air movement, most people will tolerate somewhat higher temperatures.

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

The ADG 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 the apartment 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 maximised, to minimise 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 are also 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 National Construction Code (NCC).
- 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.

The development has been assessed by the project Architect to confirm that the design complies with relevant ADG requirements. The following conclusions have been reached from the ventilation study:

- 80.8% (193 out of 239) of the residential units are naturally cross-ventilated. (Minimum required 60%)

Figure 4 Architectural Cross Ventilation Summary

Total Cross Ventilated	80.8% Dwellings - 193 Units
Building A Cross Ventilated	61.5% Dwellings - 48 Units
Building B Cross Ventilated	90.1% Dwellings - 146 Units

3.2 Landscaping

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

- The landscape design complies with the minimum 30% landscaping requirement prescribed by the SEPP.
- The landscaping summaries (refer below figure) shows significant deep soil and landscaped planting area. The integration of trees and perimeter planting for shading is very effective in reducing 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 and planting within the green spaces and around the site perimeter are evergreen species. These provide year-round environmental benefits, including wind protection, solar shading, and mitigation of heat gain.
- There is a combined area of over 1260m² of vegetation and garden, with a significant proportion of native flora plant species to be provided deemed indigenous.



3.3 Building Construction

Materials with low embodied carbon are those that require minimal energy and resources during their extraction, manufacturing, transportation, and installation processes. By choosing these materials, mixed-use projects can significantly reduce their overall carbon footprint and contribute to more sustainable construction practices. Examples include recycled steel, sustainably sourced timber, low-carbon concrete, and innovative bio-based materials. Integrating these options not only supports climate goals but also aligns with evolving regulatory standards and green building certifications.

It is recommended that the development considers the use of low embodied carbon materials such as concrete and steel with recycled content.

3.3.1 Building Materials

3.3.1.1 Walls

It is recommended that external walls generally consider metal clad, concrete or autoclaved aerated concrete panels as applicable, with acoustic insulation where required. The use of this wall system will reduce the insulation required due to the inherent R value of the wall system. The insulation required will be compliant with the applicable NatHERS and Section J calculations.

It is recommended intra-tenancy walls are to be lightweight, such as plasterboard on stud construction with acoustic insulation where required. This is advantageous from a building life-cycle perspective, as it maximises the adaptive reuse potential when a building reaches the end of its intended use.

3.3.1.2 Roof

It is proposed to maximise the use concrete roofs with plasterboard ceiling construction for all conditioned spaces throughout the buildings. Insulation is to be provided to roof areas exposed to open air. The insulation required will be compliant with the applicable NatHERS and Section J calculations. Waterproofing membrane will also be provided as part of the roof as appropriate.

3.3.1.3 Glazing

Performance Glazing will reduce the solar heat gain to the development, mostly on the western and eastern facades where low angle solar rays penetrate beneath shading devices. The glazing required will be compliant with the applicable NatHERS and Section J calculations.

3.3.1.4 Floor and Thermal Mass

Concrete slab construction is to be used for all floors throughout the development in accordance with NCC Section J requirements. Concrete has amongst the highest thermal mass capacity among a range of common building products, as presented in the below table.

Generally, denser materials have higher mass which has the ability to store heat energy and then release it slowly to the room. This storage effectively smoothens out daily temperature variations within conditioned spaces, with corresponding reductions in both heating and cooling loads. Insulation is to be provided to floor areas exposed to open air.



It is recommended to use floor systems with a thermal resistance compliant with NCC Section J. The insulation required will be compliant with the applicable NatHERS and Section J calculations.

Table 2 Indicative Thermal Mass Values of Various 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

3.3.2 Building Sealing

The purpose of sealing 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 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 development must be fitted with a sealing device such as a self-closing damper or the like.

3.3.3 Heat Island Effect Mitigation

The urban heat island (UHI) effect refers to the phenomenon where urban areas experience significantly higher temperatures than their surrounding rural regions, primarily due to human activities and the concentration of heat-absorbing surfaces like concrete and asphalt.

As cities grow and natural landscapes are replaced with buildings and roads, the heat island effect intensifies, leading to increased energy consumption, elevated emissions, and heightened health risks during heatwaves.

To mitigate this, it is recommended that light coloured roofing and wall materials of Solar Reflective Index (SRI) of 50 or more is considered for the development.



Similarly, for unshaded hardscapes and pavements, it is recommended that materials with initial SRI value of at least 39 are considered.

Figure 5 Pavements with High SRI Materials



3.4 Active Energy Efficiency

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

3.4.1 Mechanical Ventilation and Air Conditioning

Where mechanical ventilation is required, the use of energy efficiency measures will be fully explored and finalised through detailed design. These measures include linking mechanical ventilation to manual switching where allowable under the NCC 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:

- Individual 1-phase air-conditioning systems of EER > 3.0 for heating and cooling of all dwelling unit living areas of Building A.
- Central air conditioning air cooled chilled water system achieving a COP < 3.5 for cooling of all dwelling units of Building B.
- For conditioned common areas, high efficiency air conditioning system complying with Section J requirements is proposed.
- A mechanical ventilation system must be capable of being deactivated when the building or part of the building served by that system is not occupied.
- Energy end use of more than 15kVA or more is recommended to be sub metered and connected to a Building Management System (BMS) to allow data analysis. The monitoring system should be designed to have the capability to generate reports on a monthly and/or as required basis for energy and water meters.



3.4.2 Hot Water

Centralised energy-efficient electric air sourced heat pump hot water systems with minimum efficiency of $(3.5 < \text{COP} \leq 4.0)$ are to be provided for water heating within the development.

3.4.3 Lifts

Gearless traction with variable voltage variable frequency (VVVF) motor are to be provided for lifts within the proposed development.

3.4.4 Lighting

3.4.4.1 Natural Lighting

The proposed development massing maximises daylighting opportunities in regularly occupied spaces, therefore minimising the use of artificial lighting.

3.4.4.2 Artificial Lighting

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.

Furthermore, 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 most 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.

It is likely that the lighting to be used within the development will incorporate LED lamps generally. The following lighting features are to be incorporated into the development to minimise energy consumption due to lighting:

- Maximise use of LED and minimise or where possible eliminate the use of halogen down lights, as LED are much more efficient than halogen lighting.
- Use of lighting systems incorporating appropriate switching zones, time clock control and motion sensors as appropriate to optimise energy efficiency for lighting.

Furthermore, the project will comply with the applicable NCC requirements for maximum illumination power densities.

3.4.5 Appliances

For BASIX compliance, the below measures for energy performance in residential appliances have been included:

- Energy efficient dishwashers of 4 star (4.5 star to specific units as per BASIX);
- Energy efficient clothes dryers of 8 star (10 star to specific units as per BASIX);



- It has been proposed that an electric induction cooktop and an electric oven are to be installed within each residential dwelling.

3.4.6 PV Solar Green Initiatives

As the worldwide demand for fuel increases, alternative and renewable energy sources are emerging as economical and sustainable. 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.

SLR recommends the installation of roof-mounted solar PV systems.

- 48 kW PV solar systems are proposed to reduce greenhouse gas emissions.
- 48 kW PV solar systems are indicated to offset approximately 67.2 MWh/year of energy usage.
- The estimated greenhouse gas CO₂ emission saving is approximately 45 t.CO₂/annum.

The solar PV systems will provide zero operational carbon on-site renewable energy generation directly supplementing the connected building systems main electricity consumption. Thereby solar power will also serve the central air-sourced heat pump domestic hot water systems to effectively meet the associated North Sydney DCP requirements.

Figure 6 PV Solar on Roof



3.4.7 Electrification and Green Power Initiative

Electrification of the base building services of the buildings will allow for a streamlined energy system powered increasingly by renewable sources and improves compatibility with future grid decarbonisation.

It is also recommended that a high percentage of “Greenpower” should be made available to occupants, providing the opportunity to contribute to a reduction in total greenhouse gas emissions produced by the proposed development. Greenpower is produced from environmentally friendly renewable energy sources such as solar, wind, water and biomass.



When a Greenpower product is selected by the owner, the energy supplier commits to buying a certain amount of electricity from approved new renewable energy sources. The financial accounts of Greenpower suppliers are audited independently. This makes a clear distinction between the services provided by standard energy suppliers and the more sustainable service offered through Greenpower options.

The National Greenpower website¹ states that “Australian households generate almost one-fifth of Australia’s greenhouse pollution through everyday activities such as transport and household energy use”. The average household in Australia emits over seven to eight tonnes of greenhouse pollution each year through energy use alone. This is because most households source their electricity from burning coal and other fossil fuels. By choosing accredited Greenpower, up to 100% of a household’s energy usage can be generated from renewable sources.

3.5 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 residents, and visitors through the provision of an on-site alternative water supply. There are three principal forms of alternative water supply:

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

It is generally recommended that the above types of alternate water supply be explored for use in landscape irrigation and fire services, reducing the demand for potable water where applicable.

Appropriate rainwater/stormwater tanks have been considered in the design accordingly.

3.5.1 Water Efficiency

The minimum sustainable standard for water efficient fixtures and fittings is 3 star. To achieve greater than the standard level, the following water efficient fixtures and fittings are proposed to be provided for the development:

- All residential kitchen and bathroom taps are 4-star;
- All residential shower heads are 3.0 Stars (>7.5 but ≤9L/min).
- All residential toilet flushing systems are 4-star;
- Residential dishwashers to have a minimum 4-star water efficiency rating;
- Residential clothes washers to have a minimum 4-star water efficiency rating;
- All common area hydraulic fixtures (as applicable) have a minimum 4-star water efficiency rating;

Implementation of the above initiatives will assist in reducing the water consumption. Furthermore, rainwater collection is proposed to be included from the new building roofs with 10kL of rainwater tank capacity, with harvested reclaimed water to be allocated to the most

¹ <http://www.greenpower.gov.au>



appropriate intended uses. It is proposed that the harvested water is used for landscape irrigation and wash down purposes.

3.5.2 Landscape Irrigation

Based on 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 that rely primarily on rainwater for their water needs. The following is to be incorporated into the development to minimise water consumption for landscape irrigation.

- Native and other drought resistant species that rely primarily on rainwater for their water needs where appropriate and possible.
- Indigenous species are proposed to comprise over 30% of the provided landscaping.

3.6 Walker

3.7 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, reducing car parking facilities, and providing adequate bike storage facilities to minimise the requirement for individual motorised transport.

Figure 7 Public Transport Infrastructure around the Project Site

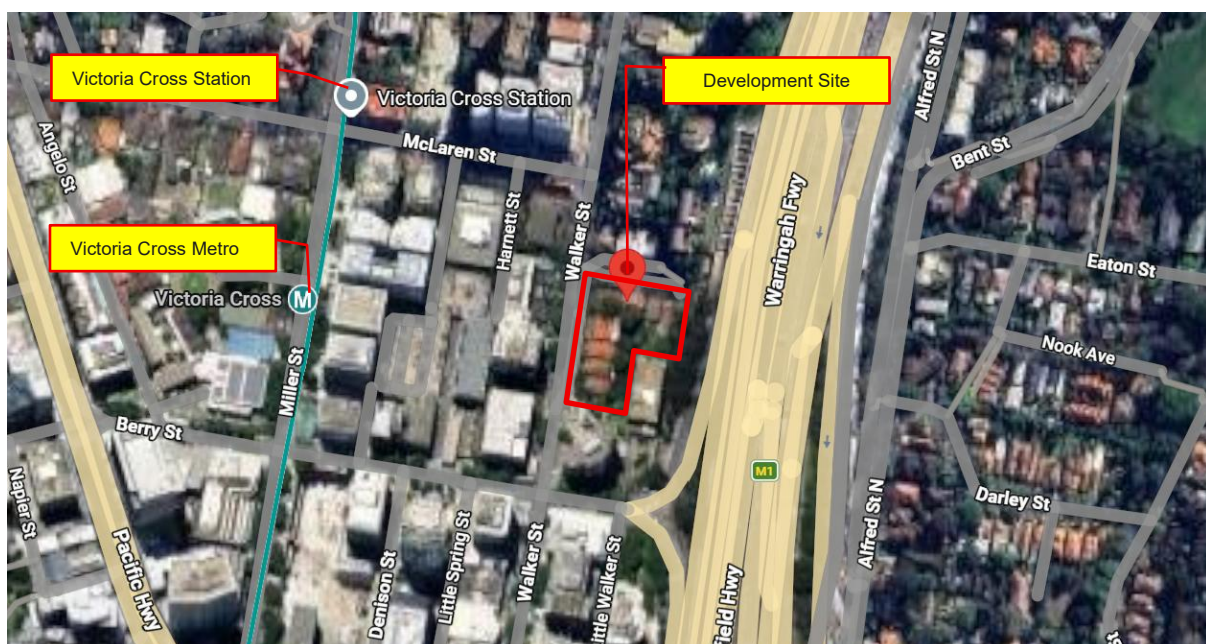


Image: Courtesy Google Maps 2026

The surrounding local context of the site is depicted above.



3.7.1 Commuting Using Public Transport

Developments that are within close proximity of good transport nodes with frequent service should be encouraged. The proposed building is located near mass transit and will allow more people to take public transportation to keep their automobiles off the road.

The proposed development is located near multiple mass transit options (Victoria Cross Station and Metro). The proposed development will encourage occupants and users of the development to use public transportation and minimise automobile use.

3.7.2 Facilitation of Pedestrian and Non-motorised Transport

Bike storage facilities are proposed to be included in the development to help 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.

3.7.3 Provision of Car Parking

Transport emissions are one of the largest contributors of greenhouse gas emissions in Australia.

The project is committed to provision for future installation of EV chargers in 100% of charging spaces.

Figure 8 EV Charging Infrastructure



3.8 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.

3.8.1 Asbestos

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

3.8.2 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. Further information can be found in the Acoustic Report developed for the project.

3.8.3 Carbon Monoxide Monitoring and Control

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

SLR Consulting generally recommends investigating a CO monitoring system to the internal carpark areas where appropriate to satisfy NCC requirements. This is to be incorporated the development accordingly.

3.8.4 Low Emission Materials

SLR generally recommends the use of paints and floor coverings with low levels of volatile organic compounds (VOC) and low formaldehyde wood products where possible.

3.9 Operational Waste Management

An Operational Waste and Recycling Management Plan is a minimum requirement to meet sustainable building design best practice. The Waste and Recycling Management Plan includes:

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

A Waste Management Plan is also incorporated to track all waste going offsite to show that at least 80% of all construction waste is re-used or recycled.



The site plan illustrates the proposed 100-unit residential building at 100 Walker Street. The building is a multi-story structure with a complex footprint, featuring various room types including studios, one-bedroom units, and two-bedroom units. Key areas include a basement level, a ground-floor entrance, and a loading bay. The plan also shows a large parking lot with numerous spaces, a bike store, a waste management area with bulk waste bins, and a substation. Surrounding streets include Walker Street to the north, Hampden Street to the east, and a title boundary to the south. The plan includes detailed annotations for room types (e.g., BT, K, D, L, S), room areas (e.g., 58.2 m², 42.8 m²), and elevations (e.g., RL 52.000, RL 51.500). A north arrow is located in the bottom left corner.

4.0 Conclusion

SLR Consulting Australia Pty Ltd (SLR) has been engaged by East Walker 88 Development Pty Ltd (the Applicant) to provide a qualitative Ecologically Sustainable Design (ESD) assessment for the residential development located at 173–179 Walker Street & 11–17 Hampden St, North Sydney.

The development is located on Walker Street and Hampden Street adjacent to the Warringah Freeway within the North Sydney local government area. It occupies a highly accessible and sustainable location, benefiting from proximity to a wide range of local amenities and facilities, and is situated near Victoria Cross Station and Metro.

In accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs) and in support of the State Significant Development Application (SSD-67175465), this study has been prepared to respond to the SEARs requirements issued pertaining to Ecologically Sustainable Design (ESD).

This study has also been prepared in accordance with the National Construction Code (NCC) 2022 Section J, North Sydney DCP & LEP, the NSW Building Sustainability Index (BASIX), NSW Apartment Design Guidelines, State Environmental Planning Policy (Sustainable Buildings) 2022 and the ESD principles as defined in section 193 of the EP&A Regulation.

The development includes many ecologically sustainable design features. This report provides an overview of these features.

The following ESD and energy efficiency features are included in the design:

- The development will incorporate passive design measures such as operable windows with high performance glazing and integral shading through articulation to limit solar heat ingress and enhance natural ventilation through the apartments, to provide passive cooling where appropriate;
 - 80.8% (193 out of 239) of the residential units are naturally cross-ventilated. (Minimum required 60%)
- The form dictated by the site has been designed to maximise the solar access of residential units for passive solar heating in winter;
 - 72.8% (174 out of 239) of apartments will achieve 2 hours solar access across the assessment window. (Minimum required 70%)
- Thermally insulated high mass constructions - Concrete slab construction is incorporated for all floors throughout the development - concrete has amongst the highest thermal mass capacity of a range of common building products. The development's external walls, structural internal walls, and slabs will be predominantly high thermal mass materials incorporating insulated constructions as required to meet all applicable NCC Section J and NatHERS requirements;
- Active energy efficiency design measures and all electric building services;
- LED energy-efficient lighting for all spaces;
- Light efficiency measures in the carparks and common areas using a combination of manual controls, time clock and motion sensors as appropriate;
- Gearless traction with variable voltage variable frequency (VVVF) motor lifts;
- Centralised energy-efficient electric air sourced heat pump hot water system with minimum efficiency of $(3.5 < \text{COP} \leq 4.0)$;



- Individual 1-phase air-conditioning systems of EER > 3.0 for heating and cooling of all dwelling unit living areas of Building A;
- Central air conditioning air cooled chilled water system achieving a COP < 3.5 for cooling of all dwelling units of Building B;
- For conditioned common areas, high efficiency air conditioning systems complying with Section J requirements;
- Energy efficient dishwashers of 4 star (4.5 star to specific units as per BASIX);
- Energy efficient clothes dryers of 8 star (10 star to specific units as per BASIX);
- Provision of electric induction cooktop and electric oven within each residential dwelling;
- Sub-metering to enable continued review of power and water consumption;
- Selection of endemic and low-maintenance landscaping species;
- Water efficient bathroom and kitchen fittings;
 - All residential kitchen and bathroom taps are 4-star;
 - All residential shower heads are 3.0 Stars (>7.5 but ≤9L/min).
 - All residential toilet flushing systems are 4-star;
 - Residential dishwashers to have a minimum 4-star water efficiency rating;
 - Residential clothes washers to have a minimum 4-star water efficiency rating;
 - All common area hydraulic fixtures (as applicable) have a minimum 4-star water efficiency rating;
- In addition, the project proposes a rainwater harvesting system with a tank storage capacity of 10 kL for reuse in irrigation and washdown;
- Low levels of volatile organic compounds (VOC) paints and floor coverings and low formaldehyde wood products where possible;
- Use of materials with high SRI values for roofing and terrace pavements.
- The project is committed to provision for future installation of EV chargers in 100% of charging spaces.
- The provision of bicycle storage spaces within the development will support the use of low emission transportation opportunities by the users and occupants;
- Planting provides added cooling during the summer months through the leaf transpiration process and is also useful for wind amelioration;
- Plant species within the development would be predominantly indigenous species that can tolerate low water to reduce maintenance requirements;
- The installation of roof-mounted solar PV systems.
 - 48 kW PV solar systems are proposed to reduce greenhouse gas emissions.
 - 48 kW PV solar systems are indicated to offset approximately 67.2 MWh/year of energy usage.
 - The estimated greenhouse gas CO₂ emission saving is approximately 45 t.CO₂/annum.



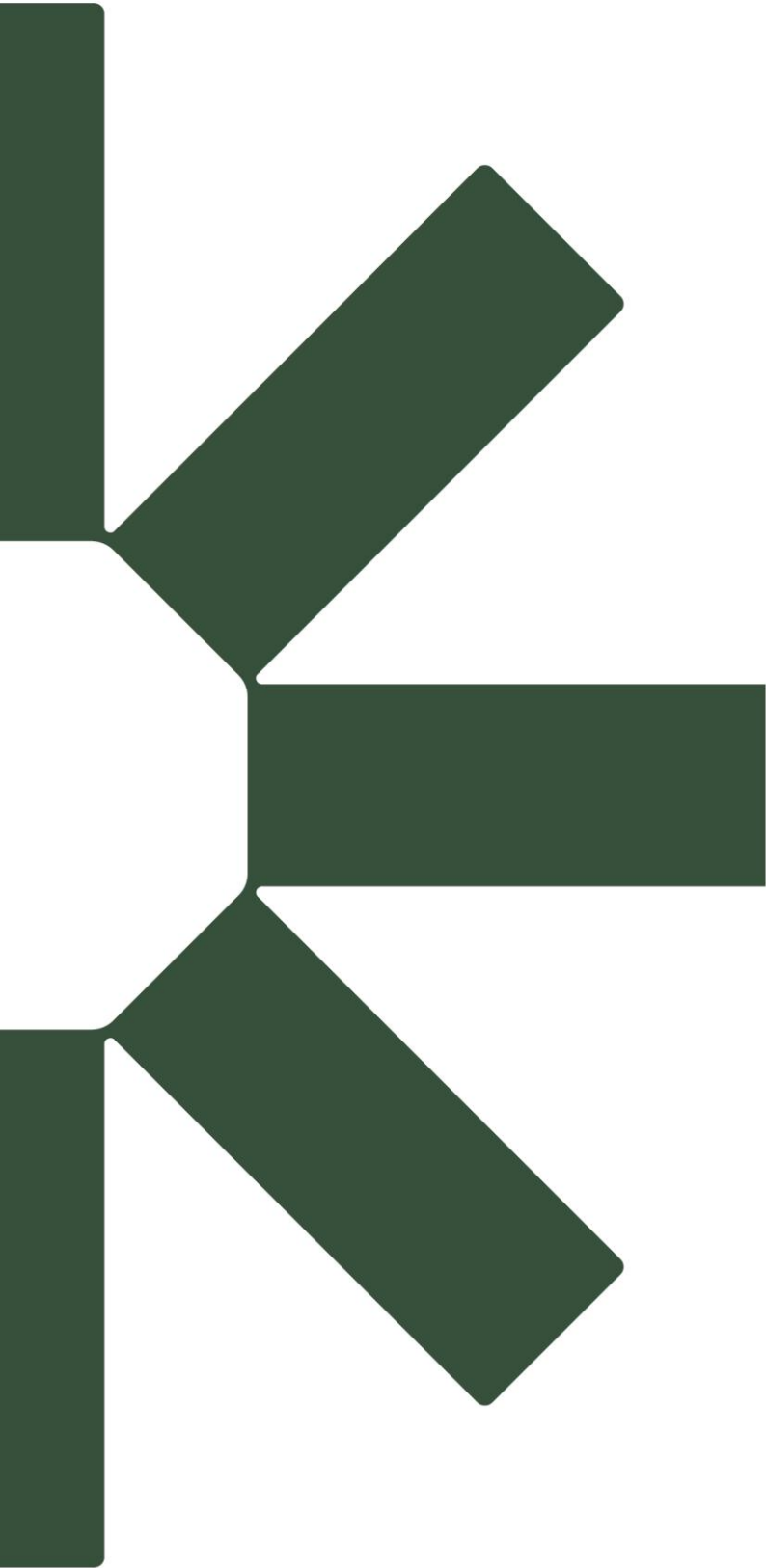
- The residential development will enjoy a high level of thermal comfort exceeding an average 7 NatHERS star rating;
- The residential development also meets BASIX targets in Energy and exceeds BASIX targets in Water.

The report body contains commitments with regard to other ESD features, such as materials, mechanical ventilation system, other appliances, and operational waste. These features are incorporated in the design to help achieve significant reductions in energy, water and resources required by the development both in building and operation, in addition to ensuring that the common areas and residential units are pleasant spaces to occupy.

It is proposed that the committed ESD initiatives continue to be developed and implemented as required, and the sustainability benchmarks are met as the design of the building and services are finalised for construction.

In addition, the development is targeting to achieve net-zero emissions compliance.





Making Sustainability Happen