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# 26-50 PARK RD, 27-47 BERRY RD, 48-54 RIVER RD NSW 2065 (AREA 22 & 23)

**ESD & Energy Efficiency Report** 

#### Prepared for:

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#### **Revision History**

Reference	Date	Details	Prepared	Authorised
-R03-v2.0	14 June 2023	Final	DS	HC
-R03-v1.0	25 November 2022	Final	DS	HC

## EXECUTIVE SUMMARY

ESD Scientific has been engaged by Berry Road Development Pty Ltd to provide a qualitative Ecologically Sustainable Design (ESD) assessment, including Energy Efficiency for the proposed new residential development at 26-50 Park Rd, 27-47 Berry Rd, 48-54 River Rd NSW 2065 (Area 22 & 23).

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 place in a number of design areas, incorporating the following:

- High-performance thermal envelope with roof, floor and external wall insulations;
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- Select centraliased energy-efficient air conditioning system;
- LED lighting to all areas with advanced controls has been proposed to different locations;
- Light-coloured roofing (cool roof) with high reflectivity and appropriate insulation to reduce solar heat gain into the apartment;
- Thermal bridging to all structural steel passes through the insulation envelope (wall, roof, ceiling floor);
- Incorporate thermal mass into the design;
- A total of 120 kW of PV system has been proposed on the roofs of Building A & B;
- Water-efficient and drought-tolerant landscaping;
- Min 40 kL rainwater collection for landscape irrigation and car wash bay;
- Install hot water recirculation system (on-demand) to all apartments;
- Select minimum 4- star water-efficient showerheads;
- Select minimum 4- star water-efficient toilets;
- Select minimum 6-star water-efficient taps;
- Water-efficient dishwasher and clothes washer;
- Incorporate water-sensitive urban design principles;
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- A total of 108 bicycle parking and 37 motorbike parking has been proposed for the development;
- Car park is designed to handle extra electrical capacity for electric car charging;
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#### EXECUTIVE SUMMARY

These features will help significantly reduce the energy and water required by the development from construction and operation. It is recommended that ESD initiatives continue to be developed and implemented during the detailed design stage of the project.

This report has been made based on our best engineering judgment and the experience gained from the past. ESD Scientific recommends that a review to be conducted during the detailed design stage of the project to confirm assessments made within this report.

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# 1 Introduction

ESD Scientific has been engaged by Berry Road Development Pty Ltd to provide a qualitative Ecologically Sustainable Design (ESD) assessment, including Energy Efficiency for the proposed new residential development at 26-50 Park Rd, 27-47 Berry Rd, 48-54 River Rd NSW 2065 (Area 22 & 23).

The report has been prepared in accordance with the Lane Cove DCP Part C St Leonards South Precinct 2020.

# 1.1 Site and Project Description

The proposed development is situated within the St Leonards South Precinct. The site is approximately 250m south of Pacific Hwy and 500m southwest of St Leonards Station. It is bounded by Park Road from the west, River Road from the south and Berry Road from the east. The development is predominantly surrounded by residential houses. An open space has been proposed to the immediate north of the site.

The local land topography indicates a gradual downhill gradient towards the south of the site. An aerial image of the subject site and the local surroundings is shown in Figure 1 and Figure 2.



#### Figure 1 Site Location

#### Figure 2 3D View of the Proposed Development



## **1.2** Development Description

The proposed development will comprise four apartment buildings, inclusive of the following:

- Building A and B align with Park Road;
- Building C and D align with Berry Road;
- a total of 306 dwellings;
- Four levels of basement car parking with wash bay;
- A single point of vehicular access from Park Road; and
- An elevated green spine parallel to Park Road and Berry Road.

# 2 Sustainability Legislation and Guidelines

# 2.1 National Construction Code – Section J Energy Efficiency

Section J of the NCC outlines energy efficiency provisions required for Class 2 to 9 of building. The provisions of the NCC Section J are designed to reduce greenhouse gas emissions by efficiently using energy in buildings.

There are Deemed-to-Satisfy subsections from J1 to J8 that focus on separate aspects of energy efficiency as follows:

- J1 Building Fabric and Glazing
- J2 Glazing provisions are now included in J1
- J3 Building Sealing
- J4 Removed
- J5 Air Conditioning and Ventilation Systems
- J6 Artificial Lighting and Power
- J7 Heated Water Supply and Swimming Pool and Spa Pool Plant
- J8 Facilities for Energy Monitoring

# 2.2 The Building Sustainability Index (BASIX)

The Building Sustainability Index (BASIX) is a state government initiative aimed at reducing the carbon footprint of new buildings and renovations. A BASIX certificate is a mandatory document that demonstrates the energy, water and thermal efficiency of new homes and renovations in New South Wales.

To obtain a BASIX certificate, the building design must meet minimum sustainability standards as outlined in the NSW government's BASIX guidelines. This includes water and energy reduction targets and the thermal comfort requirements under Nationwide House Energy Rating Scheme (NatHERS) protocol.

The BASIX certificate is issued after the submission of a BASIX assessment, which evaluates the proposed building's design and construction methods against a set of sustainability criteria. The assessment considers factors such as water and energy efficiency, renewable energy use, building fabric performance and thermal comfort.

BASIX sets water and energy reduction targets relative to the NSW average benchmark in the residential sector.

The Thermal comfort section of BASIX aims to:

- ensure thermal comfort for a dwelling's occupants, appropriate to the climate and season;
- reduce greenhouse gas emissions from artificial cooling and heating through good building design and use of appropriate construction materials; and
- reduce the demand for new, or upgraded, energy infrastructure by managing peak demand for energy required for cooling and heating.

BASIX outlines the minimum performance levels for thermal comfort of the dwelling and replaces the National Construction Code (NCC) Section J Energy Efficiency benchmarks within NSW. Thermal comfort levels are

assessed on an individual dwelling basis via a simulation method in accordance with the Nationwide House Energy Rating Scheme (NatHERS) protocol.

The minimum improvement benchmark for each index is based on the project development's location, size, height, and dwelling density.

# 2.3 Specific Requirements for Compliance

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

- Mandatory Lane Cove DCP Part C St Leonards South Precinct 2020
- Mandatory NSW Building Sustainability Index (BASIX)
- Mandatory Minimum 6 Star rating under NatHERS
- Mandatory NCC Section J Energy Efficiency
- Mandatory The State Environmental Planning Policy (SEPP) 65 supported by the Apartment Design Guide
- Voluntary Green Star Rating Tool
- Voluntary WELL Building Standard Rating Tool

The Lane Cove Council DCP has outlined some key sustainable design principles, including Energy Efficiency, Passive solar design, Thermal Mass and insulation, Natural Ventilation, Colours and Materials and water conservation etc. The document discusses essential aspects of building design where there is the potential to increase the energy efficiency of development during the Concept Design stages of a project by ecologically sustainable means.

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

# 3 ESD & Energy Efficiency Initiatives

# 3.1 Ecologically Sustainable Development Approach

To achieve a holistic approach to ESD design, a series of indicators and strategic goals have been identified for the development through the design, construction and operation phases.

The ESD & Energy Efficiency objectives, proposed targets related to the objective and measures that have been recommended or have already been implemented to meet these targets are listed in Table 2. Part of the proposed key ESD initiatives has been illustrated in Figure 3 below.

#### Figure 3 Proposed ESD Initiatives



# 3.2 Documentation

This report has been prepared based on the documentation provided by the project team and listed in Table 1 below.

#### Table 1 Project Documentation Sources

Туре	Document	Issue Date
Architectural drawing	DA Amendment Set	09/06/2023
Architectural Report	SLS Area 22&23 SEPP 65 Report	09/06/2023
Consulting Report	Waste Management Plan	08/06/2023
Consulting Report	Sustainable Travel and Access Plan	15/112022
Consulting Report	Stormwater Management Report	13/06/2023

#### Table 2 Summary of ESD & Energy Efficiency Strategies

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Energy Efficiency	<ul> <li>Design and construct energy- efficient buildings</li> </ul>	<ul> <li>High efficiency lighting and controls</li> </ul>	<ul> <li>LED lighting to all areas with advanced controls (motion sensor and zoned switch have been proposed to different locations)</li> </ul>	$\checkmark$	
	and reduce greenhouse gas (GHG) emissions	<ul> <li>High efficiency mechanical ventilation and controls</li> </ul>	<ul> <li>Car park exhaust only with CO monitors and VSD fans</li> </ul>	$\checkmark$	
	using energy in building operations	<ul> <li>High Efficiency domestic hot water system</li> </ul>	<ul> <li>Central gas-fired boiler hot water system with piping insulation</li> </ul>	$\checkmark$	<ul> <li>Refer project BASIX report for details</li> </ul>
	<ul> <li>Well-designed systems, aimed at lower operating</li> </ul>	<ul> <li>Select energy efficient air conditioning system</li> </ul>	<ul> <li>Centralised VRV/VRF air conditioning with EER/COP 3.5-5.5. Reverse cycle air conditioning with EER/COP 3.0-3.5 to low-level townhouses</li> </ul>	$\checkmark$	
	<ul> <li>emissions</li> <li>The selection of</li> </ul>	<ul> <li>Select energy efficient appliances</li> </ul>	<ul> <li>Min 3-star fridge and dishwasher</li> </ul>	$\checkmark$	
	<ul> <li>high efficiency equipment over less energy efficient alternatives</li> <li>Onsite renewable</li> </ul>	<ul> <li>Optimise insulation for energy and thermal comfort</li> </ul>	<ul> <li>High performance thermal envelope with roof, floor and external wall insulations</li> </ul>	$\checkmark$	ESDS recommends using
		<ul> <li>Reduce solar heat gain through the roof by providing a highly reflective roof</li> </ul>	<ul> <li>Use roofing material that has a high Solar Reflective Index</li> </ul>	✓	reflectivity roof
	energy sources	<ul> <li>Consider onsite renewable energy generation</li> </ul>	<ul> <li>A total of 120 kW of PV system has been proposed on the roofs of Building A &amp; B</li> </ul>	$\checkmark$	<ul> <li>Detailed markup of PV system has been provided in Appendix A</li> </ul>

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Passive Design	<ul> <li>Passive design to reduce energy consumption by taking advantage of natural heating,</li> </ul>	<ul> <li>A key ESD objective should be to optimise site conditions and minimise energy consumed for cooling and heating loads through proper building</li> </ul>	<ul> <li>DCP-compliant massing to give excellent solar exposure from north, east and west directions to apartments throughout the day, year-round</li> </ul>	~	<ul> <li>78% of apartments achieved 2 hours or more of direct sunlight compliance based on the ADG design criteria</li> </ul>
	and lighting	orientation and internal layout selection	<ul> <li>The design provides good cross-ventilation throughout the day</li> </ul>	$\checkmark$	<ul> <li>60% of apartments directly achieved cross- ventilation compliance based on the ADG design</li> </ul>
			<ul> <li>Passive solar shading has been incorporated into the design, such as vertical louvres and screens, vertical blade walls, privacy screens and balconies.</li> </ul>	✓	criteria
			<ul> <li>Skylight has been proposed for certain units to improve solar access and daylight</li> </ul>	✓	
			<ul> <li>Minimise the overshadowing impact on surrounding buildings</li> </ul>	✓	

DKO ADG compliance report for solar access and cross ventilation has been provided in Appendix B.

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Building Fabrics Performance	<ul> <li>Optimise building thermal envelope performance to reduce heating and cooling loads</li> </ul>	<ul> <li>Achieve performance requirements under BASIX</li> <li>Achieve minimum 6 Star rating under Nathers</li> <li>Incorporate thermal mass to the</li> </ul>	<ul> <li>Meet or exceed BASIX Thermal Comfort Section performance requirements</li> <li>High performance thermal envelope with roof, floor and external wall insulations</li> <li>High performance glazing system to all facades</li> <li>Light coloured roofing with high reflectivity and appropriate insulation to reduce solar heat gain into the building</li> <li>Cavity brick wall, concrete wall and hebel wall</li> </ul>	✓ ✓ ✓ ✓	<ul> <li>Refer project BASIX report for full details</li> <li>Project has achieved 7.0- star Nathers rating</li> </ul>
		<ul> <li>Reduce heat gain and heat loss through the building's thermal envelope</li> </ul>	<ul> <li>have been proposed for the external wall</li> <li>Thermal bridging to all structural steel passes through the insulation envelope (wall, roof, ceiling floor).</li> <li>All windows, doors, exhaust fans and pipe penetrations will be constructed to minimise air leakage as required by the provisions outlined in 2019 NCC</li> </ul>	✓	• This development will comply with all the requirements specified within the report during the construction stage

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Indoor Environment Quality	<ul> <li>Initiatives that enhance the comfort and well-</li> </ul>	<ul> <li>Provide sufficient fresh air and ventilation for indoor space</li> </ul>	<ul> <li>Mechanical/natural ventilation to comply with AS 1668</li> </ul>	~	<ul> <li>Adequate ventilation will be supplied in accordance with AS1668</li> </ul>
•	<ul> <li>being of occupants</li> <li>Improvements to air quality through</li> </ul>	<ul> <li>Provide thermal and acoustic comfort environment to occupants</li> </ul>	<ul> <li>Satisfy BASIX Thermal Comfort requirements. Acoustic to comply with AS 2107 recommendations for internal spaces</li> </ul>	~	
	appropriate ventilation	<ul> <li>Finishes: Use low-VOC paints, adhesives &amp; sealants, carpet and flooring; use low-</li> </ul>	<ul> <li>Select low-VOC paints, adhesives, sealants and carnets</li> </ul>	~	
	<ul> <li>The provision of high levels of thermal and acoustic comfort</li> </ul>	formaldenyde wood products	<ul> <li>Select low-formaldehyde emission-engineered wood products</li> </ul>	$\checkmark$	
<ul> <li>Optimise natural light to indoor space</li> <li>The creation of low- toxicity environments</li> </ul>	<ul> <li>Optimise natural light to indoor space</li> </ul>	<ul> <li>Use flicker-free lighting system</li> <li>Lighting illuminance meets the levels recommended in</li> </ul>	<ul> <li>Maximised natural light to indoor space</li> </ul>	✓	
	<ul><li>AS1680.2.4</li><li>Reduce visual glare</li></ul>	Lighting levels comply with AS 1680	1	<ul> <li>LED lighting to all areas with advanced controls</li> </ul>	
	through reductions to pollutants		<ul> <li>Glare is reduced through a combination of blinds, screens and fixed devices</li> </ul>	v	
	<ul> <li>Reductions to occupant stress</li> </ul>				

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Potable Water Reduction and Reuse	<ul> <li>Reduce the consumption of potable water through measures such as the incorporation of water-efficient fixtures and building systems and water reuse</li> </ul>	<ul> <li>Select water-efficient toilets, taps and showers</li> <li>Select equipment that is more water efficient than comparable standard practice Equivalents</li> <li>Water-sensitive landscape design</li> <li>Utilise rainwater and/or recycled water for irrigation</li> </ul>	<ul> <li>Toilets - 4 stars WELS rating and Watermark certified</li> <li>Taps - 6 stars WELS rating and Watermark certified</li> <li>Showerheads - 4 stars WELS rating and Watermark certified</li> <li>Install hot water recirculation system (ondemand) to all apartments</li> <li>Water-efficient dishwasher and clothes washer</li> <li>Water-efficient and drought tolerant landscaping</li> <li>Provide minimum 40 kL rainwater collection for landscape irrigation and car wash bay</li> </ul>		

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Construction & Operational Waste	<ul> <li>Minimising demolition, construction and operational waste going to landfill</li> <li>Reuse, upcycling or conversion of waste into energy</li> </ul>	<ul> <li>Reduce construction waste going to landfill by reusing or recycling waste</li> <li>Contracted to builder as a requirement on site for construction waste</li> <li>Reduce operational waste going to landfills</li> <li>Maximise source separation and recovery of recyclables</li> <li>Consider a design that can be disassembled at the end of the building's life.</li> </ul>	<ul> <li>Management of waste in accordance with the NSW Waste and Sustainable Material Strategy 2041</li> <li>To provide a Waste Management Plan for the demolition, construction and operation of the building in accordance with Lance Cove DCP</li> <li>To provide adequate recycling systems in the design of the garbage room</li> <li>Worm farms and composting facilities are provided to treat organic waste onsite</li> <li>Management practices to prevent stormwater pollution</li> <li>Management of wastewater during construction, including possible reuse on site for dust suppression</li> <li>Ongoing management to improve avoidance of waste generation</li> <li>Contractors and sub-contractors employed to undertake proposed construction works and waste removal should be educated about the waste objectives of the development</li> </ul>		<ul> <li>Maximise predicted construction waste arising from development can be reused (onsite or at another development) or recycled off-site</li> <li>Four worm farms and composting facilities are proposed for garbage room to treat organic waste on site</li> </ul>

Category Objective Proposed Target Proposed Strategy Co	ommitment	Comments
Materials <ul> <li>Use of products and materials with lower environmental impact</li> <li>Minimise the environmental impacts of refrigeration and air conditioning equipment</li> <li>Minimise the environmental impacts of refrigeration and air conditioning equipment</li> <li>Structural steelwork is supplied by a steel fabricator/steel contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI)</li> <li>Use FSC-certified timber products, such as joinery</li> <li>Use pre-cast concrete panels with recycled content</li> <li>The refrigerant is noted to be R410A which has an ozone depletion potential of zero</li> </ul>		

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Land Use & Ecology	<ul> <li>Reduce the negative impacts on sites' ecological value</li> </ul>	<ul> <li>Selecting a site for development on 'previously developed land</li> <li>Retain existing vegetation and add more Landscaped areas</li> </ul>	<ul> <li>Install native species appropriate to the area</li> <li>All existing trees along Park road, River Road and Berry Road are to be retained</li> </ul>	√ √	<ul> <li>Selection of endemic and low-maintenance landscaping species</li> </ul>
		<ul> <li>Minimise light pollution from the site</li> <li>Minimise peak stormwater outflows from the site and</li> </ul>	<ul> <li>Design external lighting to avoid emitting light into the night sky or beyond the site boundary. The minimum requirement is met where the project complies with AS 4282:1997 Control of the obtrusive effects of outdoor lighting.</li> </ul>	$\checkmark$	<ul> <li>LED lights have been proposed for all external lights to avoid emitting light</li> </ul>
		reduce pollutants entering the public sewer infrastructure and natural watercourses	<ul> <li>Meet stormwater pollutant reduction requirements according to Lane Cove DCP</li> </ul>	✓	<ul> <li>Incorporate water- sensitive urban design principles</li> </ul>
			<ul> <li>Maintain maximum Green Spine and other deep soil for percolation. 2788m2 (24% of site area) of deep soil area has been proposed</li> </ul>	✓	<ul> <li>Stormwater can be collected and stored in combined storage tanks/retaining walls.</li> </ul>
			<ul> <li>Construction phase erosion and sediment control measures will be installed and maintained in accordance with Council's requirements and Managing Urban Stormwater, Soils and Construction (Landcom, 2004).</li> </ul>	√	<ul> <li>An Erosion and Sediment Control Plan and typical details are presented in Civil drawings DAC1601 and DAC1602</li> </ul>

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Minimising Transport Impact	<ul> <li>Reduction of carbon-intensive modes of transport</li> <li>Consider the traffic impact on the local community</li> </ul>	<ul> <li>Facilitating and encouraging alternative transport options, such as bicycles or electric vehicles.</li> <li>Provide active transport facilities such as bicycle racks and locker rooms.</li> <li>Provide support for the uptake of low-emission vehicles.</li> <li>Reduce operational fuel consumption through close proximity to major arterial roads.</li> </ul>	<ul> <li>Bicycle parking with racks and lockers to encourage active transport</li> <li>Motorcycle parking has been proposed</li> <li>Three car share spaces are nominated along Park Road</li> <li>The bike repair/workshop is located at Building D Level 1</li> <li>Extra capacity to grow electric car charging to any visitor car spaces</li> <li>Parking spaces for fuel-efficient and electric vehicles are clearly designated (different coloured line marking and signage).</li> <li>The site is close to St Leonards train station; bus services on Pacific Highway and River Road; the site is located within walking distance to the future Crows Nest Metro Station</li> <li>Existing pedestrian and cycle infrastructures are available around the site, and bicycle paths and pedestrian link will be included in the future of St Leonards South precinct</li> </ul>		<ul> <li>A total of 108 bicycle parking has been proposed</li> <li>37 motorbike parking spaces are provided</li> <li>Car park is designed to handle extra electrical capacity for electric car charging</li> <li>Refer Appendix C for location of car share spaces, bicycle parking and workshop</li> </ul>

Category	Objective	Proposed Target	Proposed Strategy	Commitment	Comments
Category Green Roof or Cool Roof into the Design	Objective • Reduce the contribution of the project site to the 'heat island effect'.	<ul> <li>Proposed Target</li> <li>Use cool roof to reflect more sunlight than a conventional roof</li> <li>Maximise landscaping area to communal space and roof/wall</li> </ul>	<ul> <li>Proposed Strategy</li> <li>Light to medium coloured roofing with high reflectivity and appropriate insulation to reduce solar heat gain into the apartment</li> <li>New Landscaped areas have been proposed for all common outdoor spaces, terraces and roof gardens for building C and D</li> </ul>	Commitment ✓	Comments • Refer project landscape design for details

# 4 Conclusion

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- Incorporate thermal mass into the design;
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- Min 40 kL rainwater collection for landscape irrigation and car wash bay;
- Install hot water recirculation system (on-demand) to all apartments;
- Select minimum 4- star water-efficient showerheads;
- Select minimum 4- star water-efficient toilets;
- Select minimum 6-star water-efficient taps;
- Water-efficient dishwasher and clothes washer;
- Incorporate water-sensitive urban design principles;
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# **APPENDIX A**

Proposed PV system on Roof





# **APPENDIX B**

ADG Solar Access & Cross Ventilation Compliance





# 6.2 CROSS VENTILATION

# **APPENDIX C**

Car Share Spaces, Bicycle Parking and Workshop





Berry Road Development Pty Ltd 26-50 PARK RD, 27-47 BERRY RD, 48-54 RIVER RD NSW 2065 (AREA 22 & 23) ESD & Energy Efficiency Report

