Lachlan Line Affordable Housing

BASIX Assessment Report

Prepared for: Link Wentworth

Project No: SYD3658
Date: 5 September 2025
Revision: 03

Project:	Lachlan Line Affordable Housing
Location:	6 Halifax Street, Macquarie Park NSW 2113
Prepared by:	ADP Consulting Pty Ltd Level 6, 33 Erskine Street Sydney NSW 2000
Project No:	SYD3658
Revision:	03
Date:	5 September 2025

Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisa-tion & QA	Signature
01	31/07/25	SSDA Issue - DRAFT	MC	MC	JD	JD	BB	BB
02	20/08/25	SSDA Issue - DRAFT	MC	MC	JD	JD	BB	BB
03	5/09/25	SSDA Issue	MC	MC	JD	JD	BB	BB

Project Team	
Client / Principal	Link Wentworth
Architect	SJB Architects
Project Manager	Touchstone Partners

Contents

Appendices

Figures

Tables

Executive Summary

This BASIX assessment and certificate has been prepared by ADP Consulting to support a support a Section 4.55 modification to Development Application (DA) for a residential housing development (the proposal) to be located at 6 Halifax Street, Macquarie Park NSW 2113 (the site).

The proposed development comprises of the following:

> Two residential building (Class 2) comprising 71 apartments each.

> Two basement level of residential parking.

This BASIX report has been prepared to support the DA submission as a legislative requirement in accordance with the Environmental Planning and Assessment Act (2000) and BASIX (2023).

Based on project specific inputs and the minimum legislative provisions outlined in this report, the proposed development meets the minimum BASIX requirements for **energy**, **water**, and **thermal performance** respectively.

In line with BASIX **Material reporting** provisions, construction material specifications and estimated volumes have been provided for reporting purposes only. No performance targets are associated with this section, and compliance is not required.

Table 1: BASIX Target Scores

BASIX	Target	Score Achieved	Compliance
Water	40%	**42**	**Pass**
Energy	60%	**60**	**Pass**
Thermal Performance	Pass	**Pass**	**Pass**
Materials	NA	**100**	**Pass**

1. Introduction

ADP Consulting has been engaged by Link Wenworth to undertake the following BASIX assessment and certification for the proposed residential development located at 6 Halifax Street, Macquarie Park NSW 2113.

The purpose of this report is to provide a summary of the Environmentally Sustainable Design (ESD) initiatives adopted as part of the proposed building design. Key areas of improvement within the BASIX water, energy and thermal comfort have been identified and meet the minimum compliance measures outlined by the state of NSW.

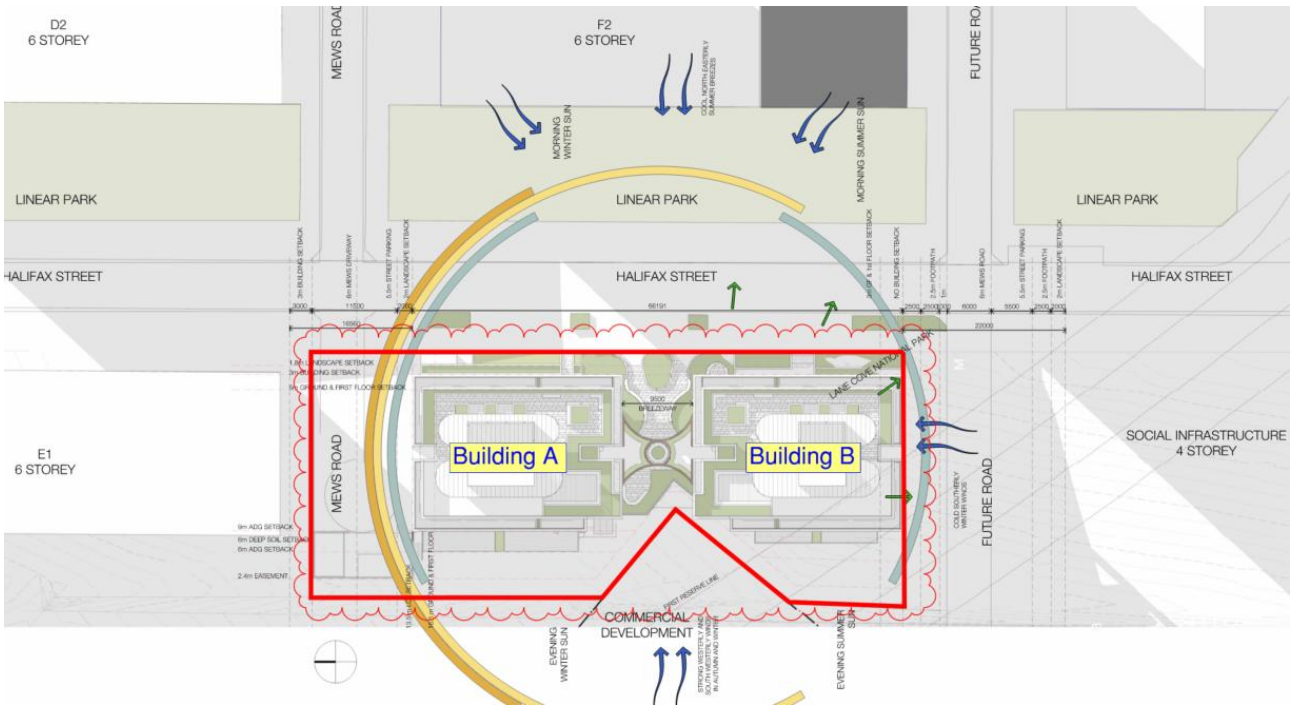
This report has been prepared as a contribution to the Section 4.55 modification to Development Application (DA) submission of the above noted project. Please note this project triggers the scale requirements (>75 homes) qualify a State Significant Development Application (SSDA).

The original SSDA submitted in February 2024 included an ESD report as required by the Sustainable Buildings State Environmental Planning Policy (SEPP) 2022, and to address items identified in the Planning Secretary's Environmental Assessment Requirements. Strategies from this ESD report produced by Introba have not changed; thus the contents of the ESD report are still relevant to this s4.55 modification to DA.

1.1 Project Context

The project site is located in Macquarie Park and is surrounded by commercial buildings and warehouses to the north and west, while bordering parks to the east and south. The development site is relatively open; despite the area of Macquarie Park experiencing significant residential growth, the tallest surrounding structures do not exceed 6 stories in height (Figure 1).

Figure 1 Proposed Development Site: 6 Halifax Street (Site Boundary highlighted in red)



The proposed development includes two level of basement car parking, along with designated parking spaces for motorcycles and bicycles for residents. The development comprises a total of 142 residential units (Class 2) distributed across two 12-storey residential buildings.

For the purposes of this BASIX assessment, ADP have identified the North-most block as **Building A** and the South-most block as **Building B.**

1.2 Assessment Assumptions and References

This BASIX assessment has been based on the following DA architectural drawings and updates provided periodically by SJB Architects:

> Final DA Architectural drawings by SJB Architects issued on 29/07/2025

Revision	Date	Issue
06	29.07.2025	Issue for DA

> BASIX RFI regarding landscape design from Link Wentworth

1.3 Apartment Naming Convention

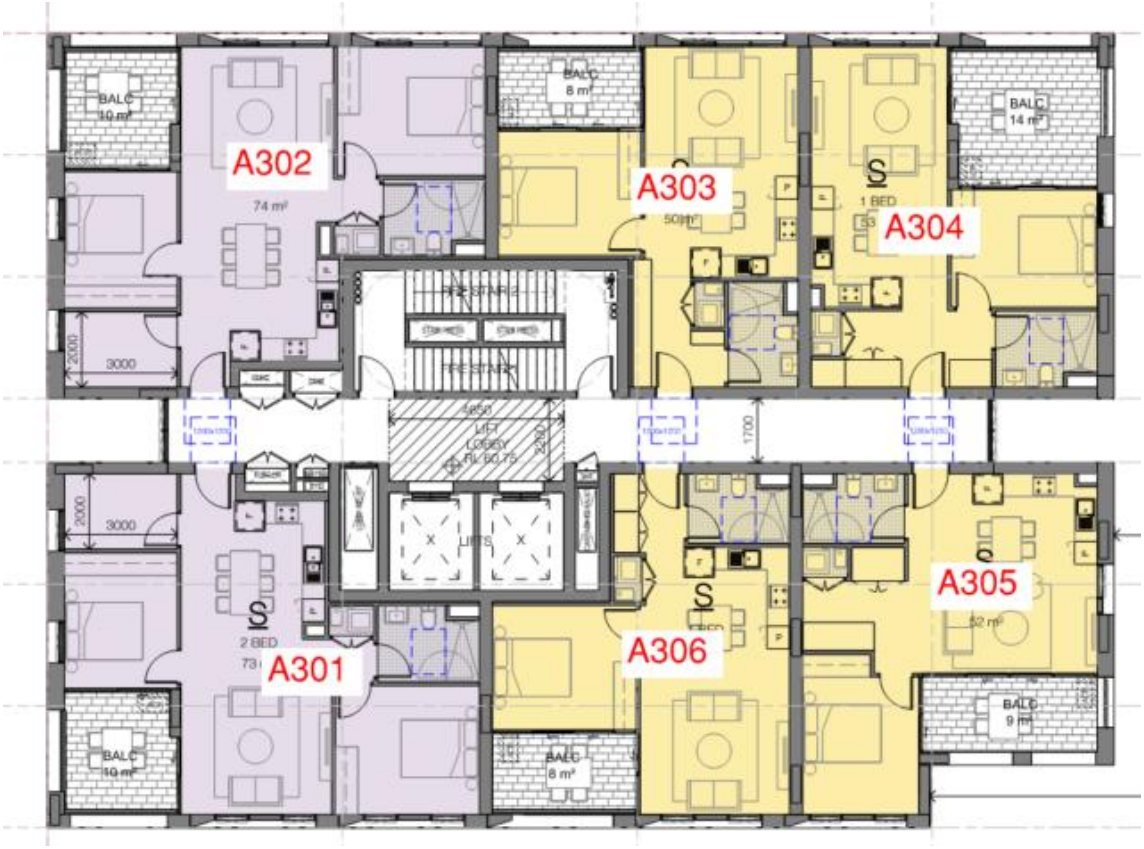
There are no unit numbers on the architectural drawings, so all units have been identified with the following naming conventions:

> Unit numbers are counted from left to right in a clockwise pattern

> Unit numbers show apartment block and level

This is how units have been identified in the BASIX and NatHERS certificate. As an example, the following image shows how units on level 3 within Building A would be named.

Figure 2 Visual example of apartment naming convention – L3



1.4 BASIX Assessment

The Building Sustainably Index (BASIX) for the state of NSW forms the minimum compliance control for any new residential (Class 1, 2 & SDA) developments as defined by the Department of Planning Industry and Environment.

The BASIX assessment outlines a minimum target of improvement for the proposed development's water, energy, and thermal comfort performance. The minimum benchmark of improvement for each index is based on the location, size, height, and dwelling density of project development.

For this type of development, the following minimum BASIX targets must be achieved as defined by the State of NSW under the SEPP 2004:

- 40% improvement in Water consumption
- 60% Improvement in Energy consumption
- All units to 'pass' the minimum thermal performance requirements for heating and cooling (as defined by the development's climate zone)
- Only the construction material specifications and volumes are required to be reported under BASIX Material reporting—there is no compliance target that needs to be achieved.

The minimum targets required for water and energy (40% and 60% respectively) represent a percentage saving and improvement for the development when compared to that of an average benchmark development for NSW.

The thermal comfort targets are assessed on an individual dwelling basis and are defined by the developments proposed location in NSW. Each dwelling must not exceed the maximum annual predicted heating and cooling load capacities outlined by BASIX; this is assessed using the NatHERS thermal comfort software HERO V4.1.

For the proposed development, the following individual dwelling targets must be achieved:

- Individual dwelling heating load: 34.4 MJ/m^2. yr
- Individual dwelling cooling load: 21.4 MJ/m^2. yr
- Individual dwelling total load: 38 MJ/m^2. yr
- Average heating load: 28.1 MJ/m^2. yr
- Average cooling load: 20.0 MJ/m^2. yr
- Average total load: 30.0 MJ/m^2. yr

1.5 SSDA ESD Report – Disclaimer

The original SSDA submitted in February 2024 included an ESD report as required by the Sustainable Buildings State Environmental Planning Policy (SEPP) 2022, and to address items identified in the Planning Secretary's Environmental Assessment Requirements (SEARs). The purpose this ESD report is to outline the measures that are proposed to be implemented to minimise the consumption of resources, energy, and water, and to demonstrate that the project has been assessed against a suitable sustainability framework.

The strategies from this ESD report produced by Introba have not changed; thus the contents of this ESD report are still relevant to this s4.55 modification to DA. Please see **Appendix D** for Introba ESD report.

2. BASIX Compliance

The following section provides a summary of the water, energy and thermal comfort initiatives proposed for development to meet compliance with the minimum BASIX requirements.

2.1 Water Strategies

The following table outlines the water strategy proposed for the development. The project is currently achieving a **42% water efficiency improvement** on the BASIX average benchmark. The target is based on a minimum 40% compliance score.

This will be achieved providing the following water commitments are implemented:

Table 2: Water Commitments

BASIX Base Case	Water Conservation Strategies
Common Areas	> Common area fixtures and appliances: – No common shower facility – 4-star flush toilets – 5-star kitchen and bathroom taps – No common appliances > Landscaping estimated areas: – Area of lawn: 593.85 m^2 – Area of garden (vegetated area excluding lawn): 473.48 m^2 > Area of indigenous or low water use species: 473.48 m^2
Individual Dwellings	> Fixtures and fittings to be included: – 4-star showerheads (>4.5 but ≤ 6L/min) – 4-star flush toilets – 5-star kitchen and bathroom taps
Appliances (For Individual Dwellings)	> Appliances[1] to be included: – Washing machine - not specified – Dishwasher – not specified
Alternative Water Use	> 20kL rainwater tank volume > Rainwater used to irrigate common landscape

BASIX Base Case	Water Conservation Strategies
Basix Water Target	**40%**
Water Score	**42%**

[1] More information on water efficient appliances can be found at www.waterrating.gov.au

2.2 Energy Strategies

The following table outlines the energy strategy proposed for the development. The project is currently achieving a **60% improvement** on the BASIX average benchmark. The target is based on a minimum 60% compliance score.

This will be achieved providing the following energy commitments are implemented:

Table 3: Energy Commitments

BASIX Base Case	Energy Conservation Strategies
Individual Dwellings	> Dedicated LED light fittings located throughout each dwelling[2] (All downlights to be sealed) > All kitchen, bathroom, and laundry exhausts to have individual fans ducted to the facade or roof with the following efficiency measures: – Kitchen: interlocked to light with timer off – Laundry: interlocked to light – Bathroom: interlocked to light > Individual heating and cooling systems: – Future Provisions only - to be provided by end user > Clothes drying line: – Private indoor and outdoor clothes drying lines to be installed to all apartments
Appliances (For Individual Dwellings)	> Efficient appliances[3] for each apartment as follows: – All apartments – Electric cooktop & electric oven – All apartments – Dishwashers not provided – All apartments – Clothes dryers not provided
Common areas	> Ventilation systems and efficiency measures as follows: – Car park – Ventilation (Supply + Exhaust); Carbon monoxide monitor + VSD fan – B2 Storage Room – Ventilation Supply only; none i.e. continuous – B1 Bin Wash/Holding Area – Ventilation Exhaust only; none i.e. continuous – B1 Bulky Waste + Bin Room – Ventilation Exhaust only; none i.e. continuous

[2] Dedicated LED must be the predominate (i.e. 80% of fittings) light fitting in each room
[3] More information on energy efficient appliances can be found at www.energyrating.gov.au

BASIX Base Case	Energy Conservation Strategies
	– B1 Main Switch Room – Ventilation Supply only; none i.e. continuous – B1 Main Comms Room – Air Conditioning System (cooling only); thermostatically controlled – B1 Cold Water Pump Room – No Mechanical Ventilated – B1Fire Pump Room/Tank Room – Ventilation (Supply Only); interlocked to light – GL Bike Parking – No Mechanical Ventilation – GL Managers Room – Air Conditioning System; Thermostatically Controlled – Ground Floor Lobbies - Air Conditioning System; Time Clock or BMS Controlled – GL Community Rooms - Air Conditioning System; Time Clock or BMS Controlled – GL Mail Rooms – Ventilation Supply Only; none i.e. continuous – Hallways – Ventilation Supply Only; none i.e. continuous – Fire Stairs – Ventilation Supply Only; none i.e. continuous – L13 Fan Room – No Mechanical Ventilation – L13 Washroom – Ventilation Exhaust only; none i.e. continuous – L13 Store Room – No Mechanical Ventilation – L13 Hot Water Plant – No Mechanical Ventilation > Lighting systems and efficiency measures as follows: – Car park – LED, zoned switching with motion – B2 Storage Room – LED, time clock and motion sensors – B1 Bin Wash/Holding Area – LED, motion sensors – B1 Bulky Waste + Bin Room – LED, motion sensors – B1 Main Switch Room – LED, manual on / manual off – B1 Main Comms Room – LED, manual on / manual off – B1 Cold Water Pump Room – LED, motion sensors – B1 Fire Pump Room/Tank Room – LED, motion sensors – GL Bike Parking – LED, time clock and motion sensors – GL Managers Office – LED, time clock and motion sensors – Ground Floor Lobbies - LED, time clock and motion sensors – GL Community Rooms - LED, time clock and motion sensors – GL Mail Rooms – LED, time clock and motion sensors – Hallways – LED, time clock and motion sensors – Fire Stairs – LED, time clock and motion sensors

BASIX Base Case	Energy Conservation Strategies
	– L13 Fan Room – LED, time clock and motion sensors – L13 Washroom – LED, time clock and motion sensors – L13 Store Room – LED, time clock and motion sensors – L13 Hot Water Plant – LED, manual on/ manual off
Central Systems	> Central hot water system: – Electric heat pump (air sourced) with R0.6 (≈ 25mm) external and internal piping insulation, 3.0 < COP <=3.5 > Vertical transport: – Gearless traction with VVVF motor with regenerative drive – Lift load capacity >1500kg
Photovoltaic system	> 30.0 kW peak array
Basix Energy Target	**60%**
Energy Score	**60%**

3. Thermal Performance & Material Index

This section outlines the thermal performance modelling and associated material selections used in the BASIX assessment. The thermal performance has been assessed using NatHERS accredited software, considering project-specific building fabric, glazing, ventilation, and operational conditions to meet BASIX energy and comfort requirements.

3.1.1 National House Energy Rating Scheme (NatHERS) Assessment

Thermal Comfort for each dwelling has been assessed out in accordance with the BASIX Thermal Comfort Protocol as defined by the Department of Planning Industry and Environment.

Thermal comfort levels for all proposed dwellings (Class 2) have been assessed using the HERO V4.1 (Thermal modelling software). This approach has been approved by the National House Energy Rating Scheme (NatHERS) and aims to predict annual heating and cooling loads of each dwelling.

To satisfy the BASIX thermal comfort requirements, the following objectives must be achieved:

- The individual dwelling to achieve a minimum NatHERS energy rating of not less than 6 stars, with heating and cooling loads not exceeding the limits specified under the BASIX thermal comfort requirements.
- The development as a whole to achieve an average energy rating of not less than 7 stars, ensuring that the combined heating and cooling loads across all dwellings remain within the average limits outlined by the BASIX scheme.

These requirements have been provided below:

Table 4: Thermal Comfort Targets

Targets	Max. Heating Load ($MJ/m^2.yr$)	Max. Cooling Load ($MJ/m^2.yr$)	Total Load ($MJ/m^2.yr$)
Individual Dwelling Loads (Class 2)	34.4	21.4	38.0
Total Average Dwelling Loads (Class 2)	28.1	20.0	30.0

3.1.2 Material Index

In response to the updated NSW Sustainable Buildings SEPP (effective October 2023), BASIX has introduced a new Material Index to quantify the embodied greenhouse gas (GHG) emissions of construction materials at the Development Application (DA) stage. This assessment focuses on Cradle-to-Gate emissions (Stages A1–A3), which include the extraction, processing, and manufacturing of materials, but exclude transport, construction activities, and site-specific emissions.

The Material Index simplifies reporting by using generic material types and standard construction forms for four major building components:

- Floors
- Walls
- Roof/Ceiling
- Windows

These elements typically account for more than 75% of a building's total embodied emissions.

It is important to note that no compliance target currently applies to the Material Index. The data collected will support future policy development and may inform future targets as part of the broader BASIX framework.

3.2 Materials Used for Thermal Modelling & BASIX Material Index

Thermal comfort modelling has been carried out in accordance with the requirements outlined in *section 3.1.1* to demonstrate compliance with BASIX thermal performance criteria. This assessment incorporates project-specific building envelope specifications, with the resulting average heating and cooling loads for the proposed development summarised in *Table 6*.

The construction materials assumed in the modelling for key building elements such as floors, walls, roofs and ceilings, and windows have been documented and reported in the BASIX Material Index, supporting both thermal performance and embodied emissions reporting.

Table 5: Fabrics Construction Details

Building Element	Material & Detail
Construction & shading	> As indicated on the architectural drawings. Balconies have been included in the assessment.
External Walls	> Fibre Cement Cladding Stud Wall + R2.5 bulk insulation (insulation only value) (GL-L10) > Fibre Cement Cladding Stud Wall + R0.2 Thermal Break + R3.5 bulk insulation (insulation only value) (BG02) > Metal Cladding Stud Wall + R2.5 bulk insulation (insulation only value) (L11-L12)
Internal Walls	> Plasterboard on studs, no insulation within dwellings rooms > Hebel Concrete wall with plasterboard on both sides, no insulation between adjacent dwellings > Hebel Concrete wall with plasterboard on both sides + R1.5 bulk insulation (insulation only value) between dwellings and corridors
Ceiling and Roof	> Concrete slab with suspended plasterboard ceiling – R6.0 Ceiling insulation (insulation only value) > 200mm suspended concrete slab, no insulation where neighbour above

Building Element	Material & Detail
	> 1 x 1200mm Ceiling fan added to living room and each bedroom for all units , 1 x 1200mm ceiling fan to living room only for studio units
Floor	> 200mm suspended concrete slab + R2.5 insulation (insulation only value) where carpark/exposed below > 200mm suspended concrete slab, no insulation where neighbour below
Floor coverings	> Tiles for Kitchen/Laundry/ Toilets > Carpets for Bedrooms > Timber for Living Rooms Exposed (no floor coverings) for Corridors
Glazing	> AG02, A201, A205, BG01, BG02, BG03, B104, B204, B205 – Awnings and Hinged Doors: U-Value ≤3.10 W/m²k, SHGC (±5%) 0.39 – Fixed and Sliding Doors: U-Value ≤2.20 W/m²k, SHGC (±5%) 0.42 > L11-12 (except for B1204) – Awnings and Hinged Doors: U-Value ≤2.91 W/m²k, SHGC (±5%) 0.44 – Fixed and Sliding Doors: U-Value ≤2.90 W/m²k, SHGC (±5%) 0.51 > B1204: – Awnings and Hinged Doors: U-Value ≤2.16 W/m²k, SHGC (±5%) 0.44 – Fixed and Sliding Doors: U-Value ≤2.9 W/m²k, SHGC (±5%) 0.51 > All Other Units: – Awnings and Hinged Doors: U-Value ≤3.10 W/m²k, SHGC (±5%) 0.39 – Fixed and Sliding Doors: U-Value ≤3.20 W/m²k, SHGC (±5%) 0.39

Please note: glazing values quoted above are based on AFRC figures and are values for the total glazing system including frame.

For all apartments, the following assumptions have been made:

> All windows and doors are weather stripped

> Window openings have been calculated as per the BASIX protocol based on input from the architectural team for fixed windows, awnings windows and sliding doors.

3.3 NatHERS Compliance Results

The building satisfies the BASIX thermal comfort requirements; the following objectives are achieved:

> Each individual dwelling achieves a minimum NatHERS energy rating of not less than 6 stars, with heating and cooling loads not exceeding the limits specified in *Table 4: Thermal Comfort Targets*.

> The development as a whole achieves an average energy rating of not less than 7 stars, ensuring that the combined heating and cooling loads across all dwellings remain within the average limits outlined in *Table 4: Thermal Comfort Targets*.

The compliant NatHERS results are detailed in *Table 6: NatHERS Thermal comfort Results*.

Table 6: NatHERS Thermal comfort Results

Level	Dwelling	Heating (MJ/m^{2}yr)	Cooling (MJ/m^{2}yr)	Total (MJ/m^{2}yr)	Rating	Compliance
Level GL	AG01	21.7	8.5	30.2	6.9	**Pass**
	AG02	20.3	14.4	34.7	6.4	**Pass**
	AG03	21.8	11.5	33.4	6.6	**Pass**
	BG01	17.4	17.3	34.7	6.4	**Pass**
	BG02	22.8	13.3	36.1	6.2	**Pass**
	BG03	28	9.8	37.8	6	**Pass**
Level 1	A101	12.3	11.4	23.6	7.7	**Pass**
	A102	20.3	10.8	31.1	6.9	**Pass**
	A103	11.4	10.4	21.9	7.9	**Pass**
	A104	14.6	8.5	23.1	7.7	**Pass**
	A105	27.3	8.4	35.7	6.3	**Pass**
	A106	6.7	6.5	13.3	8.8	**Pass**
	B101	15.6	8.7	24.3	7.6	**Pass**
	B102	14	5.5	19.5	8.2	**Pass**
	B103	20.7	9.2	29.9	7	**Pass**
	B104	16.3	13.6	29.9	7	**Pass**
	B105	22.1	12.2	34.3	6.4	**Pass**
	B106	14	5.8	19.9	8.1	**Pass**
Level 2	A201	7.5	17	24.5	7.6	**Pass**
	A202	21	15.8	36.8	6.2	**Pass**
	A203	11.2	13.3	24.5	7.6	**Pass**
	A204	19	9.1	28.1	7.2	**Pass**
	A205	16.5	12.4	28.9	7.1	**Pass**
	A206	14	11.3	25.3	7.4	**Pass**
	B201	15.6	8.7	24.3	7.6	**Pass**
	B202	14	5.5	19.5	8.2	**Pass**
	B203	20.7	9.2	29.9	7	**Pass**
	B204	16.3	13.6	29.9	7	**Pass**
	B205	22.1	12.2	34.3	6.4	**Pass**
	B206	14	5.8	19.9	8.1	**Pass**
Level 3	A301	6.7	5.4	12.1	8.9	**Pass**
	A302	7	5.5	12.5	8.9	**Pass**
	A303	9.3	4.8	14.1	8.7	**Pass**
	A304	24.9	4.5	29.3	7.1	**Pass**
	A305	23	7.5	30.5	6.9	**Pass**
	A306	14	11.3	25.3	7.4	**Pass**
	B301	20.9	6.9	27.9	7.2	**Pass**
	B302	13.8	4.8	18.6	8.2	**Pass**

	B303	15.8	4.7	20.6	8	**Pass**
	B304	23	4.9	27.9	7.2	**Pass**
	B305	23	5.4	28.4	7.2	**Pass**
	B306	17	3.6	20.6	8	**Pass**
Level 4	A401	6.3	5.5	11.8	9	**Pass**
	A402	6.6	5.5	12.1	8.9	**Pass**
	A403	8.8	4.6	13.4	8.8	**Pass**
	A404	25.1	4.3	29.4	7.1	**Pass**
	A405	22.6	7.2	29.8	7	**Pass**
	A406	8	4.1	12.1	8.9	**Pass**
	B401	21.4	7.1	28.5	7.2	**Pass**
	B402	13.9	4.5	18.4	8.3	**Pass**
	B403	16.1	4.5	20.6	8	**Pass**
	B404	23.3	4.7	28	7.2	**Pass**
	B405	22.4	5.3	27.8	7.2	**Pass**
	B406	17.3	3.4	20.8	8	**Pass**
Level 5	A501	6.9	5.2	12.1	8.9	**Pass**
	A502	7.2	5.6	12.8	8.9	**Pass**
	A503	9.9	4.8	14.7	8.7	**Pass**
	A504	25.7	4.5	30.2	6.9	**Pass**
	A505	24.3	7.4	31.7	6.8	**Pass**
	A506	9.1	4.1	13.2	8.9	**Pass**
	B501	21.9	7.6	29.5	7	**Pass**
	B502	14.4	4.3	18.7	8.2	**Pass**
	B503	16.7	4.6	21.2	7.9	**Pass**
	B504	23.8	5	28.8	7.1	**Pass**
	B505	23.8	5.3	29.1	7.1	**Pass**
	B506	17.9	3.4	21.2	7.9	**Pass**
Level 6	A601	7.2	5.3	12.5	8.9	**Pass**
	A602	7.5	5.5	13	8.9	**Pass**
	A603	10.3	4.5	14.9	8.6	**Pass**
	A604	26.2	4.9	31.2	6.9	**Pass**
	A605	24.9	7.2	32.1	6.7	**Pass**
	A606	9.5	3.9	13.4	8.8	**Pass**
	B601	22.4	7.6	30	6.9	**Pass**
	B602	14.8	4.2	19.1	8.2	**Pass**
	B603	17.2	4.4	21.6	7.9	**Pass**
	B604	24.3	4.9	29.2	7.1	**Pass**
	B605	24.3	5.3	29.6	7	**Pass**
	B606	18.4	3.4	21.9	7.9	**Pass**
Level 7	A701	7.5	5	12.5	8.9	**Pass**

	A702	7.5	5.5	13	8.9	**Pass**
	A703	9.5	4.8	14.3	8.7	**Pass**
	A704	24.9	3.7	28.6	7.1	**Pass**
	A705	25.6	6.3	31.8	6.8	**Pass**
	A706	9.7	3.9	13.6	8.8	**Pass**
	A701	7.5	5	12.5	8.9	**Pass**
	B701	23.5	6.9	30.4	6.9	**Pass**
	B702	13.2	5.9	19.2	8.2	**Pass**
	B703	17.2	4.5	21.7	7.9	**Pass**
	B704	20.9	5.6	26.5	7.4	**Pass**
	B705	26.8	4.5	31.2	6.8	**Pass**
	B706	18.5	3.6	22.1	7.9	**Pass**
Level 8	A801	7.7	5	12.7	8.9	**Pass**
	A802	7.7	5.5	13.2	8.8	**Pass**
	A803	9.8	4.8	14.6	8.7	**Pass**
	A804	25.2	3.7	28.9	7.1	**Pass**
	A805	25.9	6.1	32.1	6.7	**Pass**
	A806	10	3.8	13.8	8.8	**Pass**
	B801	23.9	6.9	30.8	6.9	**Pass**
	B802	13.5	6	19.5	8.2	**Pass**
	B803	17.6	4.4	22	7.9	**Pass**
	B804	21.2	5.5	26.8	7.3	**Pass**
	B805	27.1	4.5	31.6	6.8	**Pass**
	B806	18.8	3.6	22.5	7.8	**Pass**
Level 9	A901	7.9	4.8	12.6	8.9	**Pass**
	A902	7.9	5.4	13.3	8.8	**Pass**
	A903	10	4.9	14.9	8.6	**Pass**
	A904	25.5	3.7	29.2	7.1	**Pass**
	A905	25.7	7	32.7	6.7	**Pass**
	A906	10.2	3.8	14	8.7	**Pass**
	B901	19.7	7.5	27.2	7.3	**Pass**
	B902	13.7	6.2	19.9	8.1	**Pass**
	B903	17.9	4.4	22.2	7.8	**Pass**
	B904	21.5	5.5	27	7.3	**Pass**
	B905	27.4	4.6	32	6.7	**Pass**
	B906	19.1	3.3	22.4	7.8	**Pass**
Level 10	A1001	13.1	8.2	21.3	7.9	**Pass**
	A1002	12.4	9.6	22	7.9	**Pass**
	A1003	11.3	7.8	19.1	8.2	**Pass**
	A1004	26.4	8	34.4	6.4	**Pass**
	A1005	19.8	11.7	31.5	6.8	**Pass**

	A1006	12.2	6.8	19	8.2	**Pass**
	B1001	17.5	11.7	29.2	7.1	**Pass**
	B1002	16.6	9.5	26.1	7.4	**Pass**
	B1003	18.7	7.9	26.6	7.3	**Pass**
	B1004	23.3	8.8	32.1	6.7	**Pass**
	B1005	29	7.8	36.8	6.2	**Pass**
	B1006	20.3	5.9	26.2	7.4	**Pass**
Level 11	A1101	13.6	12.1	25.7	7.4	**Pass**
	A1102	7.3	9	16.3	8.4	**Pass**
	A1103	11.9	4.9	16.8	8.4	**Pass**
	A1104	18.1	5.9	24	7.6	**Pass**
	B1101	9.2	5.2	14.4	8.7	**Pass**
	B1102	7.4	4.8	12.1	8.9	**Pass**
	B1103	13.5	12	25.5	7.4	**Pass**
	B1104	18.9	18.6	37.5	6.1	**Pass**
Level 12	A1201	18.3	14	32.3	6.7	**Pass**
	A1202	14	12	26	7.4	**Pass**
	A1203	17	11	28	7.2	**Pass**
	A1204	22.8	9.2	31.9	6.8	**Pass**
	B1201	18.9	7.1	26	7.4	**Pass**
	B1202	12.5	10.9	23.3	7.7	**Pass**
	B1203	22.5	13.6	36	6.2	**Pass**
	B1204	21.1	15.8	37	6.1	**Pass**
Whole Building average		**16.9**	**7.4**	**24.3**	**7.6**	**Pass**

Appendix A
NatHERS Certificate

Nationwide House Energy Rating Scheme®
Class 2 Summary
NatHERS® Certificate No. #HR-KCN0FF-01

Generated on 07 Aug 2025 using Hero 4.1

Property

Address	6 Halifax Street, North Macquarie Park, NSW, NSW, 2113
Lot/DP	
NatHERS climate zone	56 - Mascot AMO

Accredited assessor

Name	Khyati Saxena
Business name	ADP Consulting
Email	k.saxena@adpconsulting.com.au
Phone	+61 405886583
Accreditation No.	10191
Assessor Accrediting Organisation	HERA

Verification

To verify this certificate, scan the QR code or visit http://www.hero-software.com.au/pdf/HR-KCN0FF-01. When using either link, ensure you are visiting http://www.hero-software.com.au

National Construction Code (NCC) requirements

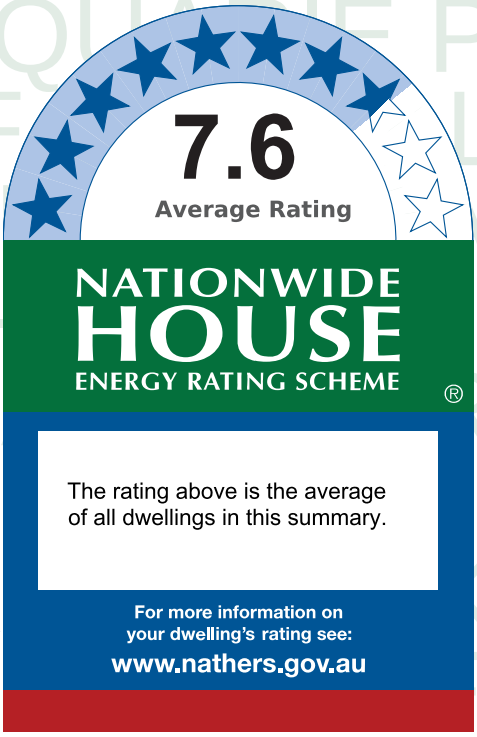
The NCC allows the use of NatHERS accredited software to comply with the energy efficiency requirements for houses (Class 1 buildings) and apartments (Class 2 sole-occupancy units and Class 4 parts of buildings). The applicable requirements for houses are detailed in Specification 42 of NCC Volume Two. For apartments the requirements are detailed in clauses J3D3 and J3D15 of NCC Volume One.

NCC 2022 includes enhanced thermal performance requirements for houses and apartments. It also includes a new whole-of-home annual energy use budget which applies to the major equipment in the home.

The NCC, and associated ABCB Standards and support material, can be accessed at www.abcb.gov.au.

Note, variations and additions to the NCC energy efficiency requirements may apply in some states and territories.

Thermal performance Star rating



NCC heating and cooling maximum loads MJ/m².yr

Limits taken from ABCB Standard 2022

	Heating	Cooling
Average load	16.9	7.4
Maximum load	29.0	19.3
Average limit	29.7	21.2
Maximum limit	32.9	20.4

Whole of Home performance rating

No Whole of Home performance rating generated for this certificate or not completed for all dwellings.

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) (MJ/m².yr)	Cooling load (load limit) (MJ/m².yr)	Total load (MJ/m².yr)	Star Rating	Whole of Home Rating
HR-54DEOK-01	A1001	13.1 (34)	8.2 (21)	21.3	7.9	n/a
HR-LFS1WI-01	A1002	12.4 (34)	9.6 (21)	22.0	7.9	n/a
HR-MATE5L-01	A1003	11.3 (34)	7.8 (21)	19.1	8.2	n/a

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) (MJ/m².yr)	Cooling load (load limit) (MJ/m².yr)	Total load (MJ/m².yr)	Star Rating	Whole of Home Rating
HR-HGU043-01	A1004	26.4 (34)	8.0 (21)	34.4	6.4	n/a
HR-ZPXII6-01	A1005	19.8 (34)	11.7 (21)	31.5	6.8	n/a
HR-CCMNP0-01	A1006	12.2 (34)	6.8 (21)	19.0	8.2	n/a
HR-A3HAD8-01	A101	12.3 (33)	11.4 (20)	23.6	7.7	n/a
HR-PSLY1Y-01	A102	20.3 (33)	10.8 (20)	31.1	6.9	n/a
HR-D9594D-01	A103	11.4 (33)	10.4 (20)	21.9	7.9	n/a
HR-8FQMWU-01	A104	14.6 (33)	8.5 (20)	23.1	7.7	n/a
HR-8257F6-01	A105	27.3 (33)	8.4 (20)	35.7	6.3	n/a
HR-4D93MJ-01	A106	6.7 (33)	6.5 (20)	13.3	8.8	n/a
HR-M0JQ8E-01	A1101	13.6 (33)	12.1 (20)	25.7	7.4	n/a
HR-ESNRHA-01	A1102	7.3 (33)	9.0 (20)	16.3	8.4	n/a
HR-IY6PVB-01	A1103	11.9 (33)	4.9 (20)	16.8	8.4	n/a
HR-CRE1DO-01	A1104	18.1 (33)	5.9 (20)	24.0	7.6	n/a
HR-HT0E30-01	A1201	18.3 (33)	14.0 (20)	32.3	6.7	n/a
HR-89EU1O-01	A1202	14.0 (33)	12.0 (20)	26.0	7.4	n/a
HR-3FVNXI-01	A1203	17.0 (33)	11.0 (20)	28.0	7.2	n/a
HR-YKJBSQ-01	A1204	22.8 (33)	9.2 (20)	31.9	6.8	n/a
HR-UH4FGB-01	A201	7.5 (33)	17.0 (20)	24.5	7.6	n/a
HR-UYG5ZU-01	A202	21.0 (33)	15.8 (20)	36.8	6.2	n/a
HR-PWZ87F-01	A203	11.2 (33)	13.3 (20)	24.5	7.6	n/a
HR-99HPV3-01	A204	19.0 (33)	9.1 (20)	28.1	7.2	n/a
HR-K4QD4C-01	A205	16.5 (33)	12.4 (20)	28.9	7.1	n/a
HR-PIE1OH-01	A206	14.0 (33)	11.3 (20)	25.3	7.4	n/a
HR-053OPF-01	A301	6.7 (34)	5.4 (21)	12.1	8.9	n/a
HR-MCDOQR-01	A302	7.0 (34)	5.5 (21)	12.5	8.9	n/a
HR-P8DIRW-01	A303	9.3 (34)	4.8 (21)	14.1	8.7	n/a
HR-GRDW2O-01	A304	24.9 (34)	4.5 (21)	29.3	7.1	n/a
HR-67PI9E-01	A305	23.0 (34)	7.5 (21)	30.5	6.9	n/a
HR-Y1410M-01	A306	8.5 (34)	4.5 (21)	13.0	8.9	n/a

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) (MJ/m².yr)	Cooling load (load limit) (MJ/m².yr)	Total load (MJ/m².yr)	Star Rating	Whole of Home Rating
HR-FW8EHM-01	A401	6.3 (34)	5.5 (21)	11.8	9.0	n/a
HR-O4IKUG-01	A402	6.6 (34)	5.5 (21)	12.1	8.9	n/a
HR-KJDNPK-01	A403	8.8 (34)	4.6 (21)	13.4	8.8	n/a
HR-JSLT6V-01	A404	25.1 (34)	4.3 (21)	29.4	7.1	n/a
HR-1F3G61-01	A405	22.6 (34)	7.2 (21)	29.8	7.0	n/a
HR-6G3H7E-01	A406	8.0 (34)	4.1 (21)	12.1	8.9	n/a
HR-IVQEU5-01	A501	6.9 (34)	5.2 (21)	12.1	8.9	n/a
HR-O62YYR-01	A502	7.2 (34)	5.6 (21)	12.8	8.9	n/a
HR-J8HIKB-01	A503	9.9 (34)	4.8 (21)	14.7	8.7	n/a
HR-65688F-01	A504	25.7 (34)	4.5 (21)	30.2	6.9	n/a
HR-6I26KT-01	A505	24.3 (34)	7.4 (21)	31.7	6.8	n/a
HR-OBNGZP-01	A506	9.1 (34)	4.1 (21)	13.2	8.9	n/a
HR-A7SZE0-01	A601	7.2 (34)	5.3 (21)	12.5	8.9	n/a
HR-7V2585-01	A602	7.5 (34)	5.5 (21)	13.0	8.9	n/a
HR-278I1G-01	A603	10.3 (34)	4.5 (21)	14.9	8.6	n/a
HR-0TFNVV-01	A604	26.2 (34)	4.9 (21)	31.2	6.9	n/a
HR-E5Y7CY-01	A605	24.9 (34)	7.2 (21)	32.1	6.7	n/a
HR-AEEV3E-01	A606	9.5 (34)	3.9 (21)	13.4	8.8	n/a
HR-42SBKB-01	A701	7.5 (34)	5.0 (21)	12.5	8.9	n/a
HR-YCBJ98-01	A702	7.5 (34)	5.5 (21)	13.0	8.9	n/a
HR-6BYAA8-01	A703	9.5 (34)	4.8 (21)	14.3	8.7	n/a
HR-U3W03C-01	A704	24.9 (34)	3.7 (21)	28.6	7.1	n/a
HR-12QTZO-01	A705	25.6 (34)	6.3 (21)	31.8	6.8	n/a
HR-MH90JJ-01	A706	9.7 (34)	3.9 (21)	13.6	8.8	n/a
HR-13UQOL-01	A801	7.7 (34)	5.0 (21)	12.7	8.9	n/a
HR-RCSM4U-01	A802	7.7 (34)	5.5 (21)	13.2	8.8	n/a
HR-E46PV1-01	A803	9.8 (34)	4.8 (21)	14.6	8.7	n/a
HR-HVU2P2-01	A804	25.2 (34)	3.7 (21)	28.9	7.1	n/a
HR-3KZI69-01	A805	25.9 (34)	6.1 (21)	32.1	6.7	n/a

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) (MJ/m².yr)	Cooling load (load limit) (MJ/m².yr)	Total load (MJ/m².yr)	Star Rating	Whole of Home Rating
HR-W4WN5K-01	A806	10.0 (34)	3.8 (21)	13.8	8.8	n/a
HR-159OTA-01	A901	7.9 (34)	4.8 (21)	12.6	8.9	n/a
HR-W71W09-01	A902	7.9 (34)	5.4 (21)	13.3	8.8	n/a
HR-BST1WC-01	A903	10.0 (34)	4.9 (21)	14.9	8.6	n/a
HR-1MJINP-01	A904	25.5 (34)	3.7 (21)	29.2	7.1	n/a
HR-MERCPB-01	A905	25.7 (34)	7.0 (21)	32.7	6.7	n/a
HR-CTZNE6-01	A906	10.2 (34)	3.8 (21)	14.0	8.7	n/a
HR-HYCNJD-01	AG01	21.7 (33)	8.5 (20)	30.2	6.9	n/a
HR-TYG742-01	AG02	20.3 (33)	14.4 (20)	34.7	6.4	n/a
HR-7DP2RO-01	AG03	21.8 (33)	11.5 (20)	33.4	6.6	n/a
HR-8X9CE1-01	B1001	17.5 (34)	11.7 (21)	29.2	7.1	n/a
HR-4OXI0J-01	B1002	16.6 (34)	9.5 (21)	26.1	7.4	n/a
HR-5AQ40O-01	B1003	18.7 (34)	7.9 (21)	26.6	7.3	n/a
HR-OAP2HY-01	B1004	23.3 (34)	8.8 (21)	32.1	6.7	n/a
HR-NQ0C2I-01	B1005	29.0 (34)	7.8 (21)	36.8	6.2	n/a
HR-FNOQR2-01	B1006	20.3 (34)	5.9 (21)	26.2	7.4	n/a
HR-O6GL5G-01	B101	15.6 (33)	8.7 (20)	24.3	7.6	n/a
HR-IAXNPP-01	B102	14.0 (33)	5.5 (20)	19.5	8.2	n/a
HR-LEO3R6-01	B103	20.7 (33)	9.2 (20)	29.9	7.0	n/a
HR-7G3PU0-01	B104	16.3 (33)	13.6 (20)	29.9	7.0	n/a
HR-EE4HZU-01	B105	22.1 (33)	12.2 (20)	34.3	6.4	n/a
HR-7C62H8-01	B106	14.0 (33)	5.8 (20)	19.9	8.1	n/a
HR-B64IOB-01	B1101	9.2 (33)	5.2 (20)	14.4	8.7	n/a
HR-KNIV0U-01	B1102	7.4 (33)	4.8 (20)	12.1	8.9	n/a
HR-CNO528-01	B1103	13.5 (33)	12.0 (20)	25.5	7.4	n/a
HR-DKNO5L-01	B1104	18.9 (33)	18.6 (20)	37.5	6.1	n/a
HR-9IMHH5-01	B1201	18.9 (33)	7.1 (20)	26.0	7.4	n/a
HR-DVF6YM-01	B1202	12.5 (33)	10.9 (20)	23.3	7.7	n/a
HR-3P5VLO-01	B1203	22.5 (33)	13.6 (20)	36.0	6.2	n/a

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) (MJ/m².yr)	Cooling load (load limit) (MJ/m².yr)	Total load (MJ/m².yr)	Star Rating	Whole of Home Rating
HR-XDXWRN-01	B1204	21.1 (33)	15.8 (20)	37.0	6.1	n/a
HR-U5858Q-01	B201	23.8 (33)	11.9 (20)	35.6	6.3	n/a
HR-JTUHJ1-01	B202	15.5 (33)	8.5 (20)	24.0	7.6	n/a
HR-8BT4UP-01	B203	13.8 (33)	13.2 (20)	26.9	7.3	n/a
HR-K5A6CM-01	B204	12.9 (33)	16.2 (20)	29.1	7.1	n/a
HR-VCUE5X-01	B205	15.9 (33)	18.7 (20)	34.5	6.4	n/a
HR-US3ZSZ-01	B206	18.1 (33)	19.3 (20)	37.4	6.1	n/a
HR-8MX2Y4-01	B301	20.9 (34)	6.9 (21)	27.9	7.2	n/a
HR-FX6CYR-01	B302	13.8 (34)	4.8 (21)	18.6	8.2	n/a
HR-S0OJA8-01	B303	15.8 (34)	4.7 (21)	20.6	8.0	n/a
HR-EAJY8G-01	B304	23.0 (34)	4.9 (21)	27.9	7.2	n/a
HR-MZ79MS-01	B305	23.0 (34)	5.4 (21)	28.4	7.2	n/a
HR-F56I8S-01	B306	17.0 (34)	3.6 (21)	20.6	8.0	n/a
HR-PFW4S6-01	B401	21.4 (34)	7.1 (21)	28.5	7.2	n/a
HR-MXJ5Q7-01	B402	13.9 (34)	4.5 (21)	18.4	8.3	n/a
HR-8VKC13-01	B403	16.1 (34)	4.5 (21)	20.6	8.0	n/a
HR-8Q17QG-01	B404	23.3 (34)	4.7 (21)	28.0	7.2	n/a
HR-XUL6UR-01	B405	22.4 (34)	5.3 (21)	27.8	7.2	n/a
HR-XAN07W-01	B406	17.3 (34)	3.4 (21)	20.8	8.0	n/a
HR-1DRYBL-01	B501	21.9 (34)	7.6 (21)	29.5	7.0	n/a
HR-XMNYE2-01	B502	14.4 (34)	4.3 (21)	18.7	8.2	n/a
HR-B4KO4W-01	B503	16.7 (34)	4.6 (21)	21.2	7.9	n/a
HR-DFTL4B-01	B504	23.8 (34)	5.0 (21)	28.8	7.1	n/a
HR-ITDJGA-01	B505	23.8 (34)	5.3 (21)	29.1	7.1	n/a
HR-5AILGI-01	B506	17.9 (34)	3.4 (21)	21.2	7.9	n/a
HR-166XMJ-01	B601	22.4 (34)	7.6 (21)	30.0	6.9	n/a
HR-4731PX-01	B602	14.8 (34)	4.2 (21)	19.1	8.2	n/a
HR-EKAC80-01	B603	17.2 (34)	4.4 (21)	21.6	7.9	n/a
HR-GR52FV-01	B604	24.3 (34)	4.9 (21)	29.2	7.1	n/a

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) (MJ/m².yr)	Cooling load (load limit) (MJ/m².yr)	Total load (MJ/m².yr)	Star Rating	Whole of Home Rating
HR-0QZL7D-01	B605	24.3 (34)	5.3 (21)	29.6	7.0	n/a
HR-XGAAEG-01	B606	18.4 (34)	3.4 (21)	21.9	7.9	n/a
HR-XT4HJ9-01	B701	23.5 (34)	6.9 (21)	30.4	6.9	n/a
HR-FLUN0G-01	B702	13.2 (34)	5.9 (21)	19.2	8.2	n/a
HR-T9WVDO-01	B703	17.2 (34)	4.5 (21)	21.7	7.9	n/a
HR-JSWJYU-01	B704	20.9 (34)	5.6 (21)	26.5	7.4	n/a
HR-E0QG8M-01	B705	26.8 (34)	4.5 (21)	31.2	6.8	n/a
HR-2RYDVV-01	B706	18.5 (34)	3.6 (21)	22.1	7.9	n/a
HR-HF4W5X-01	B801	23.9 (34)	6.9 (21)	30.8	6.9	n/a
HR-BJYEP0-01	B802	13.5 (34)	6.0 (21)	19.5	8.2	n/a
HR-IG5N1Z-01	B803	17.6 (34)	4.4 (21)	22.0	7.9	n/a
HR-I4UJ48-01	B804	21.2 (34)	5.5 (21)	26.8	7.3	n/a
HR-QHRG38-01	B805	27.1 (34)	4.5 (21)	31.6	6.8	n/a
HR-A5B1LD-01	B806	18.8 (34)	3.6 (21)	22.5	7.8	n/a
HR-E6XQT9-01	B901	19.7 (34)	7.5 (21)	27.2	7.3	n/a
HR-8AHYN1-01	B902	13.7 (34)	6.2 (21)	19.9	8.1	n/a
HR-TBZSTS-01	B903	17.9 (34)	4.4 (21)	22.2	7.8	n/a
HR-YEDCTW-01	B904	21.5 (34)	5.5 (21)	27.0	7.3	n/a
HR-1HX4SG-01	B905	27.4 (34)	4.6 (21)	32.0	6.7	n/a
HR-L5B74X-01	B906	19.1 (34)	3.3 (21)	22.4	7.8	n/a
HR-DNWUL1-01	BG01	17.4 (33)	17.3 (20)	34.7	6.4	n/a
HR-EAQJ3K-01	BG02	22.8 (33)	13.3 (20)	36.1	6.2	n/a
HR-45H77A-01	BG03	28.0 (33)	9.8 (20)	37.8	6.0	n/a
Averages	142x (Total)	16.9	7.4	24.3	7.6	n/a
Maximum Loads and Minimum Ratings		29.0	19.3	37.8	6.0	n/a

Explanatory notes

About the ratings

The thermal performance star rating in this Certificate is the average rating of all NCC Class 2 dwellings in an apartment block. The Whole of Home performance rating in this Certificate is the lowest rating for the apartment block. Individual unit ratings are listed in the *'Summary of all dwellings'* section of this Certificate.

NatHERS ratings use computer modelling to evaluate a home's energy efficiency and performance. They use localised climate data and standard assumptions on how people use their home to predict the energy loads and societal cost. The thermal performance star rating uses the home's building specifications, layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings) to predict the heating and cooling energy loads. The Whole of Home performance rating uses information about the home's appliances and onsite energy production and storage to estimate the homes societal cost.
For more details about an individual dwelling's assessment, refer to the individual dwelling's NatHERS Certificate (accessible via link).

Accredited Assessors

For high quality NatHERS Certificates, always use an accredited or licenced assessor registered with an Assessor Accrediting Organisation (AAO). AAOs have strict quality assurance processes, and professional development requirements ensuring consistently high standards for assessments.

Non-accredited assessors (Raters) have no ongoing training requirements and are not quality assured.

Licensed assessors in the Australian Capital Territory (ACT) can produce assessments for regulatory purposes only, using endorsed software, as listed on the ACT licensing register.

Any queries about this report should be directed to the assessor. If the assessor is unable to address questions or concerns, contact the AAO specified on the front of this certificate.

Disclaimer

The NatHERS Certificate format is developed by the NatHERS Administrator. However, the content in certificates is entered by the assessor. It is the assessor's responsibility to use NatHERS accredited software correctly and follow the NatHERS Technical Note to produce a NatHERS Certificate.

The predicted annual energy use, cost and greenhouse gas emissions in this NatHERS Certificate are an estimate based on an assessment of the dwelling's design by the assessor. It is not a prediction of actual energy use, cost or emissions. The information and ratings may be used to compare how other dwellings are likely to perform when used in a similar way.

Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, behaviour, appliance performance, indoor air temperature and local climate.

Not all assumptions made by the assessor while using the NatHERS accredited software tool are presented in this report and further details or data files may be available from the assessor.

ADP
An ayesa company

Appendix B
Stamped Drawings

ADP
An ayesa company

Appendix C
BASIX Certificate

BASIX™Certificate

Building Sustainability Index
www.planningportal.nsw.gov.au/development-and-assessment/basix

Multi Dwelling

Certificate number: 1811778M

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 10/09/2020 published by the Department. This document is available at www.planningportal.nsw.gov.au/definitions

Secretary
Date of issue: Friday, 05 September 2025
To be valid, this certificate must be submitted with a development application or lodged with a complying development certificate application within 3 months of the date of issue.

When submitting this BASIX certificate with a development application or complying development certificate application, it must be accompanied by NatHERS certificate HR-KCN0FF-01.

Project summary	
Project name	Lachlan's Line
Street address	6 HALIFAX STREET MACQUARIE PARK 2113
Local Government Area	RYDE
Plan type and plan number	Deposited Plan 1224238
No. of residential flat buildings	2
Residential flat buildings: no. of dwellings	142
Multi-dwelling housing: no. of dwellings	0
No. of single dwelling houses	0

Project score			
Water	✔	42	Target 40
Thermal Performance	✔	Pass	Target Pass
Energy	✔	60	Target 60
Materials	✔	-100	Target n/a

Certificate Prepared by
Name / Company Name: ADP CONSULTANTS PTY LTD
ABN (if applicable): 68610202198

Description of project

Project address	
Project name	Lachlan's Line
Street address	6 HALIFAX STREET MACQUARIE PARK 2113
Local Government Area	RYDE
Plan type and plan number	Deposited Plan 1224238

Project type	
No. of residential flat buildings	2
Residential flat buildings: no. of dwellings	142
Multi-dwelling housing: no. of dwellings	0
No. of single dwelling houses	0

Site details	
Site area (m²)	2508
Roof area (m²)	452
Non-residential floor area (m²)	0
Residential car spaces	36
Non-residential car spaces	0

Common area landscape	
Common area lawn (m²)	593.85
Common area garden (m²)	473.48
Area of indigenous or low water use species (m²)	473.48

Assessor details and thermal loads	
Assessor number	HERA10191
Certificate number	HR-KCN0FF-01
Climate zone	56

Project score			
Water	✔	42	Target 40
Thermal Performance	✔	Pass	Target Pass
Energy	✔	60	Target 60
Materials	✔	-100	Target n/a

Description of project

The tables below describe the dwellings and common areas within the project

Residential flat buildings - Building A, 71 dwellings, 12 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A1001	2	71	0	0	0
A1005	1	52.2	0	0	0
A103	1	34.5	0	0	0
A1101	2	68.5	0	0	0
A1201	2	68.4	0	0	0
A201	1	52.6	0	0	0
A205	1	50.9	0	0	0
A303	1	49.3	0	0	0
A401	2	71	0	0	0
A405	1	52.2	0	0	0
A503	1	49.3	0	0	0
A601	2	71	0	0	0
A605	1	52.2	0	0	0
A703	1	49.3	0	0	0
A801	2	71	0	0	0
A805	1	52.2	0	0	0
A903	1	49.3	0	0	0
AG01	1	52.8	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A1002	2	73	0	0	0
A1006	1	49.9	0	0	0
A104	1	51.3	0	0	0
A1102	2	69	0	0	0
A1202	2	69	0	0	0
A202	1	54.6	0	0	0
A206	1	48.8	0	0	0
A304	1	52.5	0	0	0
A402	2	73	0	0	0
A406	1	49.9	0	0	0
A504	1	52.5	0	0	0
A602	2	73	0	0	0
A606	1	49.9	0	0	0
A704	1	52.5	0	0	0
A802	2	73	0	0	0
A806	1	49.9	0	0	0
A904	1	52.5	0	0	0
AG02	1	48.7	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A1003	1	49.3	0	0	0
A101	1	51.5	0	0	0
A105	1	49.7	0	0	0
A1103	2	68.9	0	0	0
A1203	2	68.9	0	0	0
A203	1	34.5	0	0	0
A301	2	71	0	0	0
A305	1	52.2	0	0	0
A403	1	49.3	0	0	0
A501	2	71	0	0	0
A505	1	52.2	0	0	0
A603	1	49.3	0	0	0
A701	2	71	0	0	0
A705	1	52.2	0	0	0
A803	1	49.3	0	0	0
A901	2	71	0	0	0
A905	1	52.2	0	0	0
AG03	2	68.6	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A1004	1	52.5	0	0	0
A102	1	54.6	0	0	0
A106	1	48.8	0	0	0
A1104	2	69.7	0	0	0
A1204	2	69.7	0	0	0
A204	1	51.3	0	0	0
A302	2	73	0	0	0
A306	1	49.9	0	0	0
A404	1	52.5	0	0	0
A502	2	73	0	0	0
A506	1	49.9	0	0	0
A604	1	52.5	0	0	0
A702	2	73	0	0	0
A706	1	49.9	0	0	0
A804	1	52.5	0	0	0
A902	2	73	0	0	0
A906	1	49.9	0	0	0

Residential flat buildings - Building B, 71 dwellings, 12 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
B1001	1	52.2	0	0	0
B1005	2	71	0	0	0
B103	1	34.5	0	0	0
B1101	2	69.6	0	0	0
B1201	2	69.6	0	0	0
B201	1	50.5	0	0	0
B205	1	51.5	0	0	0
B303	1	49.3	0	0	0
B401	1	52.2	0	0	0
B405	2	71	0	0	0
B503	1	49.3	0	0	0
B601	1	52.2	0	0	0
B605	2	71	0	0	0
B703	1	49.3	0	0	0
B801	1	52.2	0	0	0
B805	2	71	0	0	0
B903	1	49.3	0	0	0
BG01	2	68.6	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
B1002	1	52.5	0	0	0
B1006	1	49.9	0	0	0
B104	1	54.6	0	0	0
B1102	2	68.9	0	0	0
B1202	2	68.9	0	0	0
B202	1	51.3	0	0	0
B206	1	48.8	0	0	0
B304	2	73	0	0	0
B402	1	52.5	0	0	0
B406	1	49.9	0	0	0
B504	2	73	0	0	0
B602	1	52.5	0	0	0
B606	1	49.9	0	0	0
B704	2	73	0	0	0
B802	1	52.5	0	0	0
B806	1	49.9	0	0	0
B904	2	73	0	0	0
BG02	1	37.1	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
B1003	1	49.3	0	0	0
B101	1	49.7	0	0	0
B105	1	51.5	0	0	0
B1103	2	69	0	0	0
B1203	2	69	0	0	0
B203	1	34.5	0	0	0
B301	1	52.2	0	0	0
B305	2	71	0	0	0
B403	1	49.3	0	0	0
B501	1	52.2	0	0	0
B505	2	71	0	0	0
B603	1	49.3	0	0	0
B701	1	52.2	0	0	0
B705	2	71	0	0	0
B803	1	49.3	0	0	0
B901	1	52.2	0	0	0
B905	2	71	0	0	0
BG03	1	53	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
B1004	2	73	0	0	0
B102	1	51.3	0	0	0
B106	1	48.8	0	0	0
B1104	2	68.4	0	0	0
B1204	2	68.4	0	0	0
B204	1	54.6	0	0	0
B302	1	52.5	0	0	0
B306	1	49.9	0	0	0
B404	2	73	0	0	0
B502	1	52.5	0	0	0
B506	1	49.9	0	0	0
B604	2	73	0	0	0
B702	1	52.5	0	0	0
B706	1	49.9	0	0	0
B804	2	73	0	0	0
B902	1	52.5	0	0	0
B906	1	49.9	0	0	0

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - Building A

Common area	Floor area (m²)
Fire Stairs #1	371.8
GL Mail Room #1	9.6
Hallway #1	485
L13 Store Room #1	4.6

Common area	Floor area (m²)
GL Bike Parking	13.8
GL Manager's Office	6.3
L13 Fan Room	4
L13 Washroom #1	8.8

Common area	Floor area (m²)
GL Community room #1	26.2
Ground floor lobby #1	34.6
L13 Hot Water Plant #1	78.7

Common areas of unit building - Building B

Common area	Floor area (m²)
Fire Stairs #2	367.5
GL Mail Room #2	9.6
L13 Fan Room	4
L13 Washroom #2	8.8

Common area	Floor area (m²)
GL Bike Parking	13.8
Ground floor lobby #2	34.6
L13 Hot Water Plant #2	78.7
Lift bank (No. 1)	-

Common area	Floor area (m²)
GL Community room #2	25.7
Hallway #2	485
L13 Store Room #2	4.6
Lift bank (No. 2)	-

Common areas of the development (non-building specific)

Common area	Floor area (m²)
B1 Bin Wash/Holding Area	80.7
B1 Fire Pump Room	50
B2 Car Park Storage	323.9

Common area	Floor area (m²)
B1 Bulky Waste + Bin Room	71.7
B1 Main Comm Room	13.4
Car Park	1774.5

Common area	Floor area (m²)
B1 Cold Water Pump Room	9.2
B1 Main Switch Room	23

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - Building A

- (a) Buildings
  - (i) Materials
- (b) Dwellings
  - (i) Water
  - (ii) Energy
  - (iii) Thermal Performance
- (c) Common areas and central systems/facilities
  - (i) Water
  - (ii) Energy

2. Commitments for Residential flat buildings - Building B

- (a) Buildings
  - (i) Materials
- (b) Dwellings
  - (i) Water
  - (ii) Energy
  - (iii) Thermal Performance
- (c) Common areas and central systems/facilities
  - (i) Water
  - (ii) Energy

3. Commitments for common areas and central systems/facilities for the development (non-building specific)

- (a) Buildings 'Other'
  - (i) Materials
- (b) Common areas and central systems/facilities
  - (i) Water

(ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carriedout. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for Residential flat buildings - Building A

(a) Buildings

(i) Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the “Floor types”, “External wall types”, “Internal wall types”, “Ceiling and roof types”, “Frames” and “Glazing” tables below.			✔
(b) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all specifications included in the tables below.		✔	
(c) The applicant must construct the floors, walls, roof, ceiling and roof, windows, glazed doors and skylights of the development in accordance with the specifications listed in the tables below. In the case of glazing, a 5% variance from the area values listed in the “Frames” and “Glazing” tables is permitted.	✔	✔	✔
(d) The applicant must show through receipts that the materials purchased for construction are consistent with the specifications listed in the below tables.			✔

Floor types			
Floor type	**Area (m2)**	**Insulation**	**Low emissions option**
suspended floor above garage, frame: suspended concrete slab	1198.1	fibreglass batts or roll	-
floors above habitable rooms, frame: suspended concrete slab	3933.8	-	-

External wall types				
External wall type	**Construction type**	**Area (m2)**	**Low emissions option**	**Insulation**
External wall type 1	framed (fibre cement sheet or boards),frame:light steel frame	3944.4	-	fibreglass batts or roll

Internal wall types			
Internal wall type	**Construction type**	**Area (m2)**	**Insulation**
Internal wall type 1	plasterboard, frame:light steel frame	2929.3	fibreglass batts or roll

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	**Volume (m³)**	**Low emissions option**
yes	296.4	-

Ceiling and roof types			
Ceiling and roof type	**Area (m²)**	**Roof Insulation**	**Ceiling Insulation**
concrete - plasterboard internal, frame: light steel frame	4495.75	-	fibreglass batts or roll
concrete - plasterboard internal, frame: light steel frame	364.4	-	fibreglass batts or roll

Glazing types			Frame types				
Single glazing (m²)	**Double glazing (m²)**	**Triple glazing (m²)**	**Aluminium frames (m²)**	**Timber frames (m²)**	**uPVC frames (m²)**	**Steel frames (m²)**	**Composite frames (m²)**
-	1714.3	-	1714.3	-	-	-	-

(b) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✔	✔
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔	✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 4.5 but <= 6 L/min)	4 star	5 star	5 star	-	not specified	not specified	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	**Alternative water supply systems**	**Size**	**Configuration**	**Landscape connection**	**Toilet connection (s)**	**Laundry connection**	**Pool top-up**	**Spa top-up**
All dwellings	No alternative water supply	-	-	-	-	-	-	-

(ii) Energy	**Show on DA plans**	**Show on CC/CDC plans & specs**	**Certifier check**
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔ ✔	✔
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	Central hot water system (No. 1)	individual fan, ducted to façade or roof	interlocked to light with timer off	individual fan, ducted to façade or roof	interlocked to light	individual fan, ducted to façade or roof	interlocked to light

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
A1101, A1204	no individual system	no individual system	no individual system	no individual system	0	no
All other dwellings	no individual system	no individual system	no individual system	no individual system	0	yes

	Individual pool			Individual spa		Appliances other efficiency measures				
Dwelling no.	Pool heating system	Pool Pump	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Dishwasher	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	-	electric cooktop & electric oven	-	not specified	yes	yes

(iii) Thermal Performance	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✔		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✔	

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
A1001	13.1	8.2	21.300
A1002	12.4	9.6	22.000
A1003	11.3	7.8	19.100
A1004	26.4	8	34.400

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
A1005	19.8	11.7	31.500
A1006	12.2	6.8	19.000
A101	12.3	11.4	23.700
A102	20.3	10.8	31.100
A103	11.4	10.4	21.800
A104	14.6	8.5	23.100
A105	27.3	8.4	35.700
A106	6.7	6.5	13.200
A1101	13.6	12.1	25.700
A1102	7.3	9	16.300
A1103	11.9	4.9	16.800
A1104	18.1	5.9	24.000
A1201	18.3	14	32.300
A1202	14	12	26.000
A1203	17	11	28.000
A1204	22.8	9.2	32.000
A201	7.5	17	24.500
A202	21	15.8	36.800
A203	11.2	13.3	24.500
A204	19	9.1	28.100
A205	16.5	12.4	28.900
A206	14	11.3	25.300
A301	6.7	5.4	12.100
A302	7	5.5	12.500
A303	9.3	4.8	14.100
A304	24.9	4.5	29.400
A305	23	7.5	30.500
A306	8.5	4.5	13.000
A401	6.3	5.5	11.800
A402	6.6	5.5	12.100
A403	8.8	4.6	13.400

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
A404	25.1	4.3	29.400
A405	22.6	7.2	29.800
A406	8	4.1	12.100
A501	6.9	5.2	12.100
A502	7.2	5.6	12.800
A503	9.9	4.8	14.700
A504	25.7	4.5	30.200
A505	24.3	7.4	31.700
A506	9.1	4.1	13.200
A601	7.2	5.3	12.500
A603	10.3	4.5	14.800
A604	26.2	4.9	31.100
A605	24.9	7.2	32.100
A606	9.5	3.9	13.400
A701	7.5	5	12.500
A703	9.5	4.8	14.300
A704	24.9	3.7	28.600
A705	25.6	6.3	31.900
A706	9.7	3.9	13.600
A801	7.7	5	12.700
A802	7.7	5.5	13.200
A803	9.8	4.8	14.600
A804	25.2	3.7	28.900
A805	25.9	6.1	32.000
A806	10	3.8	13.800
A901	7.9	4.8	12.700
A902	7.9	5.4	13.300
A903	10	4.9	14.900
A904	25.5	3.7	29.200
A905	25.7	7	32.700
A906	10.2	3.8	14.000

	Thermal loads		
Dwelling no.	**Area adjusted heating load (in MJ/m²/yr)**	**Area adjusted cooling load (in MJ/m²/yr)**	**Area adjusted total load (in MJ/m²/yr)**
AG01	21.7	8.5	30.200
AG02	20.3	14.4	34.700
AG03	21.8	11.5	33.300
All other dwellings	7.5	5.5	13.000

(c) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	4 star	5 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/ BMS**
Fire Stairs #1	ventilation supply only	none i.e., continuous	light-emitting diode	time clock and motion sensors	no
GL Bike Parking	no mechanical ventilation	-	light-emitting diode	time clock and motion sensors	no
GL Community room #1	air conditioning system	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no
GL Mail Room #1	ventilation supply only	none i.e., continuous	light-emitting diode	time clock and motion sensors	no
GL Manager's Office	air conditioning system	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no
Ground floor lobby #1	air conditioning system	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no
Hallway #1	ventilation supply only	none i.e., continuous	light-emitting diode	time clock and motion sensors	no
L13 Fan Room	no mechanical ventilation	-	light-emitting diode	motion sensors	no
L13 Hot Water Plant #1	no mechanical ventilation	-	light-emitting diode	manual on / manual off	no
L13 Store Room #1	no mechanical ventilation	-	light-emitting diode	time clock and motion sensors	no
L13 Washroom #1	ventilation exhaust only	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no

Central energy systems	Type	Specification
Lift bank (No. 1)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 13 number of levels from the bottom of the lift shaft to the top of the lift shaft: 16 number of lifts: 2 lift load capacity: >1500kg
Central hot water system (No. 1)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: R0.6 (~25 mm); (b) Piping internal to building: R0.6 (~25 mm) (c) Unit Efficiency: 3.0 < COP <= 3.5

2. Commitments for Residential flat buildings - Building B

(a) Buildings

(i) Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the “Floor types”, “External wall types”, “Internal wall types”, “Ceiling and roof types”, “Frames” and “Glazing” tables below.			✔
(b) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all specifications included in the tables below.		✔	
(c) The applicant must construct the floors, walls, roof, ceiling and roof, windows, glazed doors and skylights of the development in accordance with the specifications listed in the tables below. In the case of glazing, a 5% variance from the area values listed in the “Frames” and “Glazing” tables is permitted.	✔	✔	✔
(d) The applicant must show through receipts that the materials purchased for construction are consistent with the specifications listed in the below tables.			✔

Floor types

Floor type	Area (m2)	Insulation	Low emissions option
suspended floor above garage, frame: suspended concrete slab	1173.8	fibreglass batts or roll	-
floors above habitable rooms, frame: suspended concrete slab	3933.8	-	-

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	framed (fibre cement sheet or boards),frame:light steel frame	3944.4	-	fibreglass batts or roll

Internal wall types

Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	plasterboard, frame:light steel frame	2929.3	fibreglass batts or roll

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	Volume (m^3)	Low emissions option
yes	296.4	-

Ceiling and roof types			
Ceiling and roof type	Area (m^2)	Roof Insulation	Ceiling Insulation
concrete - plasterboard internal, frame: light steel frame	4495.75	-	fibreglass batts or roll
concrete - plasterboard internal, frame: light steel frame	364.4	-	fibreglass batts or roll

Glazing types			Frame types				
Single glazing (m^2)	Double glazing (m^2)	Triple glazing (m^2)	Aluminium frames (m^2)	Timber frames (m^2)	uPVC frames (m^2)	Steel frames (m^2)	Composite frames (m^2)
-	1714.3	-	1714.3	-	-	-	-

(b) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✔	✔
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔	✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 4.5 but <= 6 L/min)	4 star	5 star	5 star	-	not specified	not specified	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	**Alternative water supply systems**	**Size**	**Configuration**	**Landscape connection**	**Toilet connection (s)**	**Laundry connection**	**Pool top-up**	**Spa top-up**
All dwellings	No alternative water supply	-	-	-	-	-	-	-

(ii) Energy	**Show on DA plans**	**Show on CC/CDC plans & specs**	**Certifier check**
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔ ✔	✔
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	Central hot water system (No. 2)	individual fan, ducted to façade or roof	interlocked to light with timer off	individual fan, ducted to façade or roof	interlocked to light	individual fan, ducted to façade or roof	interlocked to light

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
B1101, B1201	no individual system	no individual system	no individual system	no individual system	0	no
All other dwellings	no individual system	no individual system	no individual system	no individual system	0	yes

	Individual pool			Individual spa		Appliances other efficiency measures				
Dwelling no.	Pool heating system	Pool Pump	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Dishwasher	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	-	electric cooktop & electric oven	-	not specified	yes	yes

(iii) Thermal Performance	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✔		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✔	

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
B1001	17.5	11.7	29.200
B1002	16.6	9.5	26.100
B1003	18.7	7.9	26.600
B1004	23.3	8.8	32.100

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
B1005	29	7.8	36.800
B1006	20.3	5.9	26.200
B101	15.6	8.7	24.300
B102	14	5.5	19.500
B103	20.7	9.2	29.900
B104	16.3	13.6	29.900
B105	22.1	12.2	34.300
B106	14	5.8	19.800
B1101	9.2	5.2	14.400
B1102	7.4	4.8	12.200
B1103	13.5	12	25.500
B1104	18.9	18.6	37.500
B1201	18.9	7.1	26.000
B1202	12.5	10.9	23.400
B1203	22.5	13.6	36.100
B1204	21.1	15.8	36.900
B201	23.8	11.9	35.700
B202	15.5	8.5	24.000
B203	13.8	13.2	27.000
B204	12.9	16.2	29.100
B205	15.9	18.7	34.600
B206	18.1	19.3	37.400
B301	20.9	6.9	27.800
B302	13.8	4.8	18.600
B303	15.8	4.7	20.500
B304	23	4.9	27.900
B305	23	5.4	28.400
B306	17	3.6	20.600
B401	21.4	7.1	28.500
B402	13.9	4.5	18.400
B403	16.1	4.5	20.600

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
B404	23.3	4.7	28.000
B405	22.4	5.3	27.700
B406	17.3	3.4	20.700
B501	21.9	7.6	29.500
B502	14.4	4.3	18.700
B503	16.7	4.6	21.300
B504	23.8	5	28.800
B505	23.8	5.3	29.100
B506	17.9	3.4	21.300
B601	22.4	7.6	30.000
B602	14.8	4.2	19.000
B603	17.2	4.4	21.600
B604	24.3	4.9	29.200
B605	24.3	5.3	29.600
B606	18.4	3.4	21.800
B701	23.5	6.9	30.400
B702	13.2	5.9	19.100
B703	17.2	4.5	21.700
B704	20.9	5.6	26.500
B705	26.8	4.5	31.300
B706	18.5	3.6	22.100
B801	23.9	6.9	30.800
B802	13.5	6	19.500
B803	17.6	4.4	22.000
B804	21.2	5.5	26.700
B805	27.1	4.5	31.600
B806	18.8	3.6	22.400
B901	19.7	7.5	27.200
B902	13.7	6.2	19.900
B903	17.9	4.4	22.300
B904	21.5	5.5	27.000

	Thermal loads		
Dwelling no.	**Area adjusted heating load (in MJ/m²/yr)**	**Area adjusted cooling load (in MJ/m²/yr)**	**Area adjusted total load (in MJ/m²/yr)**
B905	27.4	4.6	32.000
B906	19.1	3.3	22.400
BG01	17.4	17.3	34.700
BG02	22.8	13.3	36.100
All other dwellings	28	9.8	37.800

(c) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	4 star	5 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/ BMS**
Fire Stairs #2	ventilation supply only	none i.e., continuous	light-emitting diode	time clock and motion sensors	no
GL Bike Parking	no mechanical ventilation	-	light-emitting diode	time clock and motion sensors	no
GL Community room #2	air conditioning system	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no
GL Mail Room #2	ventilation supply only	none i.e., continuous	light-emitting diode	time clock and motion sensors	no
Ground floor lobby #2	air conditioning system	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no
Hallway #2	ventilation supply only	none i.e., continuous	light-emitting diode	time clock and motion sensors	no
L13 Fan Room	no mechanical ventilation	-	light-emitting diode	motion sensors	no
L13 Hot Water Plant #2	no mechanical ventilation	-	light-emitting diode	manual on / manual off	no
L13 Store Room #2	no mechanical ventilation	-	light-emitting diode	time clock and motion sensors	no
L13 Washroom #2	ventilation exhaust only	time clock or BMS controlled	light-emitting diode	time clock and motion sensors	no
Lift bank (No. 1)	-	-	light-emitting diode	connected to lift call button	no
Lift bank (No. 2)	-	-	light-emitting diode	connected to lift call button	no

Central energy systems	Type	Specification
Lift bank (No. 2)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 13 number of levels from the bottom of the lift shaft to the top of the lift shaft: 16 number of lifts: 2 lift load capacity: >1500kg
Central hot water system (No. 2)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: R0.6 (~25 mm); (b) Piping internal to building: R0.6 (~25 mm) (c) Unit Efficiency: 3.0 < COP <= 3.5

3. Commitments for common areas and central systems/facilities for the development (non-building specific)

(a) Buildings 'Other'

(i) Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the “Floor types”, “External wall types”, “Internal wall types”, “Ceiling and roof types”, “Frames” and “Glazing” tables below.			✔
(b) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all specifications included in the tables below.		✔	
(c) The applicant must construct the floors, walls, roof, ceiling and roof, windows, glazed doors and skylights of the development in accordance with the specifications listed in the tables below. In the case of glazing, a 5% variance from the area values listed in the “Frames” and “Glazing” tables is permitted.	✔	✔	✔
(d) The applicant must show through receipts that the materials purchased for construction are consistent with the specifications listed in the below tables.			✔

Floor types

Floor type	Area (m2)	Insulation	Low emissions option
garage floor, frame: concrete slab on ground	2346.4	-	-

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	concrete block/ plasterboard,frame:no frame	2132	-	-

Internal wall types

Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	single skin masonry, frame:no frame	643	-

Reinforcement concrete frames/columns

Building has reinforced concrete frame/columns?	Volume (m^3)	Low emissions option
yes	50	-

Ceiling and roof types			
Ceiling and roof type	**Area (m²)**	**Roof Insulation**	**Ceiling Insulation**
concrete - bare internal, frame: no frame	1220	-	-

Glazing types			Frame types				
Single glazing (m²)	**Double glazing (m²)**	**Triple glazing (m²)**	**Aluminium frames (m²)**	**Timber frames (m²)**	**uPVC frames (m²)**	**Steel frames (m²)**	**Composite frames (m²)**
-	0	-	0	-	-	-	-

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	4 star	5 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	20000	To collect run-off from at least: - 450 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 1067.33 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Fire sprinkler system (No. 1)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/ BMS
B1 Bin Wash/Holding Area	ventilation exhaust only	-	light-emitting diode	motion sensors	no
B1 Bulky Waste + Bin Room	ventilation exhaust only	-	light-emitting diode	motion sensors	no
B1 Cold Water Pump Room	no mechanical ventilation	-	light-emitting diode	motion sensors	no
B1 Fire Pump Room	ventilation supply only	interlocked to light	light-emitting diode	manual on / manual off	no
B1 Main Comm Room	ventilation supply only	thermostatically controlled	light-emitting diode	manual on / manual off	no
B1 Main Switch Room	ventilation supply only	none i.e., continuous	light-emitting diode	manual on / manual off	no
B2 Car Park Storage	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	no
Car Park	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	no

Central energy systems	Type	Specification
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 30 peak kW
Other	-	-

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

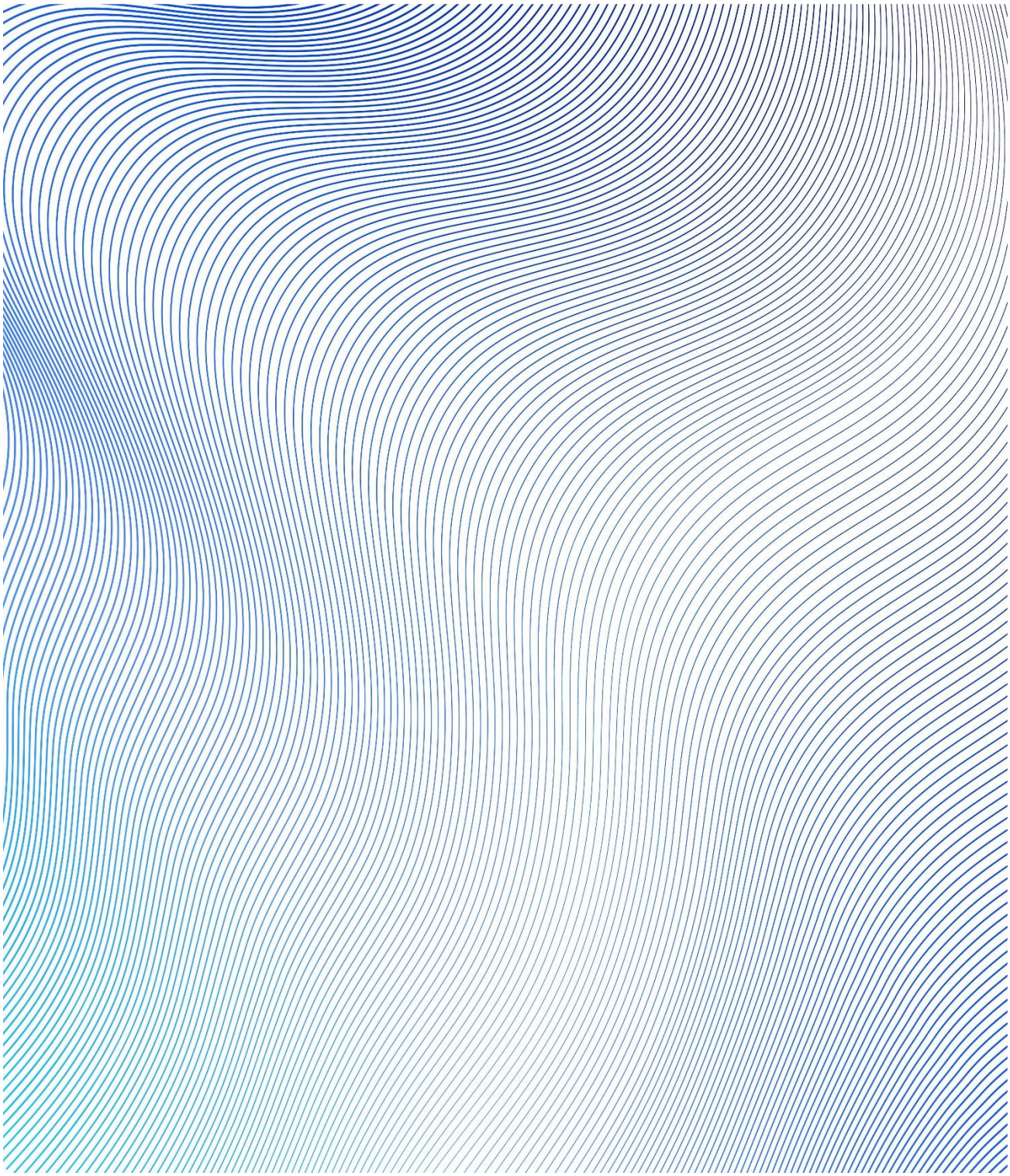
ADP
Consulting : Engineering

Appendix D
Introba ESD Opportunities Report

Lachlan Line Affordable Housing

SSDA ESD REPORT

February 2024



Issue	Description	Date (DD.MM.YY)	Prepared By	Signed Off
00	For Issue	01.02.24	DAA	AK

Project Office

Introba Consulting Pty Ltd
Level 12, 77 Pacific Highway
North Sydney NSW 2065
+61 2 9431 9431

Project Contact:

David Arnott

david.arnott@introba.com

Disclaimer

www.introba.com

V1.0

Table of Contents

1 Introduction

1.1 General

This ESD Report has been prepared by Introba on behalf of the applicant to support a State Significant Development Application for a 135 new affordable homes on Lachlan's Line – Lot 117 (the 'Site').

The purpose of this ESD Report is to address the items identified in the Planning Secretary's Environmental Assessment Requirements, under "Ecologically Sustainable Development"; to outline the measures that are proposed to be implemented to minimise the consumption of resources, energy, and water, and to demonstrate that the project has been assessed against a suitable sustainability framework.

1.2 Project Vision

In the early sustainability visioning workshops the project team arrived at the following "To deliver cost effective affordable housing of the highest quality in design, with a strong focus on occupant comfort, amenity and well-being. A place which seeks to seamlessly embed sustainability initiatives, rather than being driven by them." As such the project has targeted specific initiatives which speak to this vision and creates a well-supported framework for it to manifest into a well-connected, close community, where people are proud to call it home, and has contributed positively to the precinct.

1.3 Project Description - Existing Site Conditions

Lachlan's lane lot 117 sits within the North Ryde Station Precinct on Wallumedgal Country. The Precinct is located in North Ryde approximately 15km north west of Sydney CBD, encompassing highrise developments, park amenities and social infrastructure. It's within 500m of the North Ryde Station.

Lot 117 is located on the Western side of the precinct. To the north and east of the site are high rise residential developments, to the south of the site is most likely to be a park, to the west is zoned to be a commercial developments and parks in the future as described in the Macquarie Park Place Strategy.

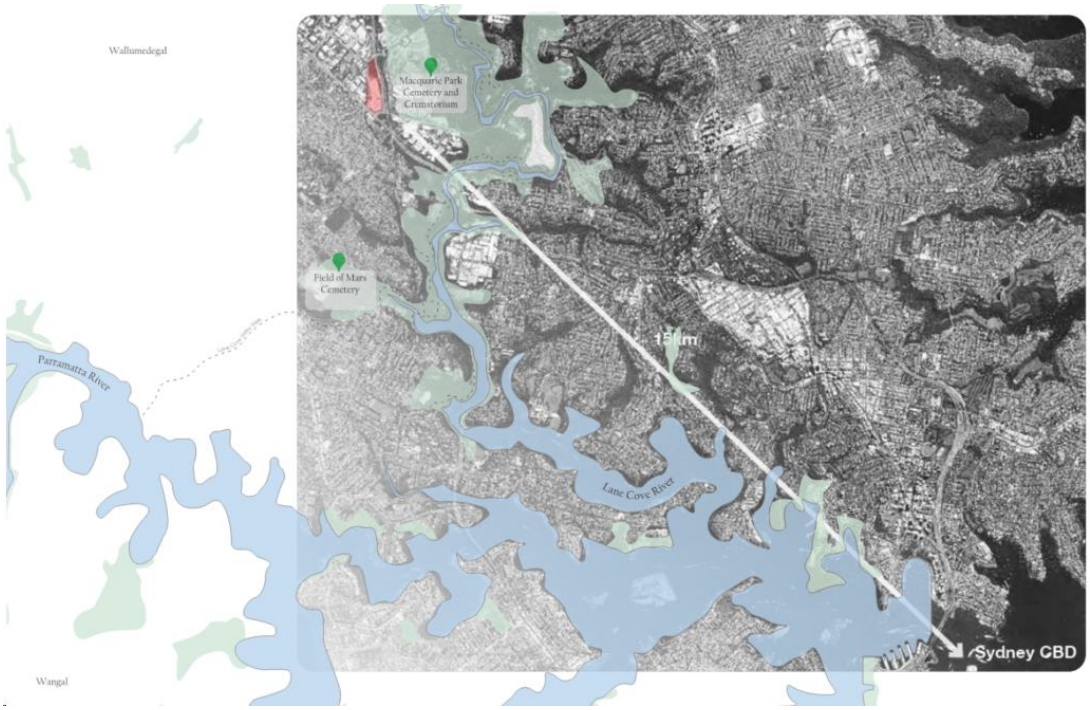


Figure 1 *Context of the Site – Courtesy SJB Architects*

1.4 Development Scope

The proposed residential development consists of the construction of 135 affordable apartments, across 13 levels, a community roof garden plus generous landscaped community spaces on the ground plain and a two-levels of basement carpark.

1.5 Referenced Standards

This report has been undertaken with reference to the following:

- Section 193 of the EP&A Regulation Environmental Planning and Assessment Regulation 2000
- State Environmental Planning Policy (Sustainable Buildings) 2022, specifically Chapter 2 & Schedule 1
- SEARS Application for the project, relevant clauses.

1.6 Source Documentation

The project's architectural documentation has been used in the preparation of this report. Inputs have also been coordinated with all relevant Consultants.

1.7 Limitations of This Report

Due care and skill have been exercised in the preparation of this report.

This ESD Report outlines the proposed measures to be implemented to minimise the consumption of resources, energy, and water. It demonstrates that the project has been adopted the principals of a suitable accredited rating scheme. It should be read in conjunction with the current project documentation, and specific applications may vary during the project's design development.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Introba for detailed advice, which will consider that party's requirements.

2 SEARS Requirements

Table 1 outlines the SEARS requirements for Lot 117 Lachlan's Line, specifically regarding the Ecological Sustainable Design (ESD) report.

Key Sustainability Issues	Relevant Report Section
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 4, Pg 8*
Demonstrate how the development will meet or exceed the relevant industry-recognised building sustainability and environmental performance standards.	*Sections 3, Pg 7; Section 5, Pg 11 & Appendices*
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.	*Section 6, Pg 15*

Table 1 *SEARS Requirements*

3 State Environment Planning Policy (SEPP) Sustainable Buildings 2020

The Sustainable Buildings SEPP came into effect on the 1 Oct 2023. The nature of this project means that it must respond to *Chapter 2 Standards for residential development – BASIX* and *Schedule 1 Standards for erection of BASIX buildings and change of use BASIX buildings.*

This change introduced a significant uplift in the requirements for BASIX certification, a summary of the key changes are as follows:

- Uplift in required Energy target of 140%
- Uplift in the required Thermal Comfort "caps", for the climate zone this project is located in this resulted in
    - 24% uplift in the heating cap
    - 27% uplift in the heating cap
- Introduction of a total thermal comfort cap – which is equal to a minimum 7-star NatHERS rating
- Introduction of a new Materials section within the tool
- Update to grid emission factors in NSW to better reflect our transitioning grid and reward electrification initiatives in projects

Given the significant uplift in required performance, and given it is a purpose built residential assessment tool; we have nominated BASIX as our way to "*Demonstrate how the development will meet or exceed the relevant industry-recognised building sustainability and environmental performance standards*." Under SEARS. Further details of BASIX inclusions can be found in Section 5 of this report.

BASIX® off-line energy target and maximum allowable thermal loads calculator — Version 3.0 — August- 22

INPUT

Postcode (please type)	Building type (please select)
2113	High rise (6 - 20 storeys multi units)

RESULTS

NatHERS climate zone (primary)	Suburb
56	NORTH RYDE

BASIX energy target	Current	Proposed
	25	60

Maximum allowable thermal loads (MJ/m^2/year)	Individual dwellings		Average of all dwellings	
	Current	Proposed	Current	Proposed
Total	-	38.0	-	30.0
Heating	45.5	34.4	40.0	28.1
Cooling	29.5	21.4	26.0	20.0

Figure 2 *BASIX energy target and thermal loads calculator*

4 Response to ESD Principles of Section 193 of EP&A Regulation 2021

The following section details how the proposed project incorporate the principles of ESD in accordance with Section 193 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). They are:

1. The Precautionary Principle
2. Inter-Generational Equity
3. Conservation of Biological Diversity and Ecological Integrity
4. Improved Valuation, Pricing, and Incentive Mechanisms.

These are discussed in further detail below.

4.1 The Precautionary Principle:

The principles of ecologically sustainable development are the following:

(a) the "precautionary principle", namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options.

4.1.1 Project Response

The precautionary principle is linked to many of the initiatives targeted in the project. The architecture has been carefully considered to maximise amenity through natural ventilation and solar access but balanced with appropriate window to wall ratios and external shading to minimise excessive solar gains and high heat loads. Through co-ordination with the architects we have been able to deliver a building which rates on average 7.6 star under NatHERS. This in turn minimises the on-going operation energy use of the building and speaks to resilience by not placing undue strain on the grid.

The building is all-electric and could be operationally net-zero energy with a decarbonised grid or through the procurement of Green Power (noting the uplift in cost of the latter and the impact this would have on affordable housing tenants). On-site renewable energy is also provided through a solar array on each roof.

Careful consideration has also been given to landscape design and planting selection, where a balance has been reached between minimising potable water demand against the benefits of biophilia, ecological communities and storm water run-off reductions that occur with the ground plane articulation.

4.2 Inter-Generational Equity

Per Section 193 of the EP & A Regulation:

(b) ***"inter-generational equity",*** *namely, that the present generation should ensure that the environment's health, diversity, and productivity are maintained or enhanced for the benefit of future generations.*

4.2.1 Project Response

The creation of an engaged and thriving community could be considered at the heart of inter-generational equity. When people are proud to call somewhere home, where they have the opportunity to interact and share with one another they will ensure that the environment's health, diversity, and productivity are maintained or enhanced for the benefit of future generations.

The opportunities given to future residents of this project, through generous landscaping and sheltered places, allows for a connected community to happen. Part of the inspiration behind these design principles is linked to connection to Country from First Nations people who have been practicing inter-generational equity for millennia.

Being so close to so much natural beauty, the design seeks to revitalise the local ecosystems, to become a green connector between the future Macquarie Place precinct to the west, the linear parks and central park within the precinct and the national park to the far East.

The project is well connected within the precinct and to the other hubs, including transport, shopping, and recreation. In addition to this carshare and bicycle parking for the residents and visitors are provided. It is within 500m of the North Ryde Station, with multiple bus stops nearby. Shops and parks are in close vicinity, schools. Additional and future social infrastructure is planned within the Macquire Place masterplan to the west only benefitting the future resident further.

4.3 Conservation of Biological Diversity and Ecological Integrity

Per Section 193 of the EP & A Regulation:

(c) ***"conservation of biological diversity and ecological integrity",*** *namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*

4.3.1 Project Response

Building on the two previous responses, the "conservation of biological diversity and ecological integrity" is a significant driver of the landscape and architectural expressions of the project. The landscape language of the site is to mimic the surrounding ecosystem on Country, pulling the natural landscape into the site. The selection of flora are endemic and site appropriate to provide and restore the native ecosystem, inviting insects, birds, and encourage a regeneration of life and habitat back to the site.

There is a diversity of spaces provided in the project to attract a variety of human and non-human occupants alike, bringing vitality, viability and opportunities for evolution of both the site and the surrounding precinct.

4.4 Improved Valuation, Pricing, and Incentive Mechanisms

Per Section 193 of the EP & A Regulation:

> *(d) "improved valuation, pricing and incentive mechanisms", namely, that environmental factors should be included in the valuation of assets and services, such as:*
>
> *(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance, or abatement,*
>
> *(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
>
> *(iii) environmental goals, having been established, should be pursued most cost-effectively by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their solutions and responses to environmental problems.*

4.4.1 Project Response

Being an affordable housing all selected initiatives in the project were carefully considered so that maximum benefit was delivered at minimum cost. The project sustainability vision was central to this "To deliver cost effective affordable housing of the highest quality in design, with a strong focus on occupant comfort, amenity and well-being. A place which seeks to seamlessly embed sustainability initiatives, rather than being driven by them."

Regarding pollution waste, the project seeks to minimise construction and operational waste through implementing best practices. i.e. 90% diversion from landfill. In additional material selection will look for opportunities to utilise recycled or re-use elements to promote circular economy principals

Regarding stormwater, the project has been designed to manage both peak discharge rates and stormwater quality by including a rainwater tank and extensive landscaping.

The project is well located with multiple public transport options and many amenities close by. On-site bicycle parking facilities will be provided along with car share options overall reducing the use of private vehicles and the associated GHG emissions. The projects substation has also been sized for the potential integration of electric vehicles.

The project has taken a holistic building approach to sustainability such that the sustainability initiatives have largely been embedded in the nature of the development rather than as additional 'add-on' items. For example, the external shading structures are integrated through the façade articulation. Careful consideration has been given to incorporate excellent distribution of daylight to provide amenity and reduce ongoing operating costs. In this way, sustainability can be implemented in a way that minimises the cost.

A further response to item is that the project exceeds code minimum requirements for envelope thermal performance which reduces operating costs and can enhance thermal comfort. Passive design opportunities have been maximised for a reduction in HVAC capex and peak load, with the project aiming to be primarily cooled by natural ventilation via extensive awning windows and sliding doors + ceiling fans. By taking a holistic approach to the design and recognising where trade-offs in capital cost can be made, operational costs and potentially total costs of ownership can be reduced.

5 Relevant Industry Recognised Building Standard – BASIX

The higher standards for BASIX were introduced via the State Environmental Planning Policy (Sustainable Buildings) 2022. The increases also align with NSW and national policies to achieve zero emission homes, such as the **Net Zero Plan Stage 1** and the national **Trajectory for Low Energy Buildings.**

When the proposed changes BASIX was announced the described the changes as follows.

"*The new standards will result in:*

- *cheaper energy bills. You'll use less electricity so your bills will be cheaper – you could be saving as much as $980 a year on energy bills.*
- *more comfortable homes. Your home will be naturally cooler in summer, warmer in winter, which means you won't be turning the heater or air conditioner on as often.*
- *fewer carbon emissions. This contributes towards our goal of net zero homes by 2050.*

BASIX has stopped 12.3 million tonnes of greenhouse gas from going into our air since 2004. Our updated standards will save another 150,000 tonnes of greenhouse gases a year. This is equal to running 31 wind turbines, enough electricity to power 27,000 homes each year, or planting around half a million trees."

The ambition to embed best practice sustainability is given effect by our commitment to meeting and exceeding these new BASIX standards. Below is a summary of the relevant specifications found in the BASIX certificate in Appendix A

Water commitments		
Common Area Garden and Lawn	Total area of lawn to be maintained ≤ 593.85m^2 Total area of garden to be maintained ≤ 473.48m^2 100% of garden to be indigenous or low water use species.	
Common Area Fixtures and appliances	Showerheads	No common area showers
	Toilets	4 star WELS
	Taps	5 star WELS
	Clothes washers	No common laundry facility
Sole occupancy unit Fixtures and appliances	Showerheads	4 star (>6 but ≤ 7.5L/min) WELS
	Toilets	4 star WELS
	Kitchen taps	5 star WELS
	Bathroom vanity taps	5 star WELS
	Dishwashers	6 star WELS
Alternative water	Rainwater tank capacity ≤ 20,000L Harvested roof area ≥ 450 m^2 Alternative water use(s): • Irrigation of all landscaping • 1 car washing bay	
Fire sprinkler test system	Fire sprinkler test water to be contained on a closed loop	

Table 2 *BASIX – Water commitments*

Energy commitments – Central Systems and Dwelling Details		
Central Systems		
Hot water	System type	Electric heat pump – air sourced. 3.0 < COP ≤3.5
	System efficiency	3.0 < COP ≤3.5 or better
	Piping insulation	Minimum R0.6
Cooling system	System type	No common cooling system
Heating system	System type	No common heating system
Photovoltaic system	Minimum 30 kWp system to be installed	
Lifts	System type	Gearless traction with V V V F motor and regenerative drive
	Load capacity	> 1,500 kg
BMS	Building Management System (BMS) to be installed	
Clothes dryer	No common area clothes dryer(s)	
Clothes washer	No common area clothes washer(s)	
Dwelling Details		
Mechanical ventilation	Bathrooms	Individual fan, ducted to façade or roof Manual switch on / timer off
	Kitchen	Individual fan, ducted to façade or roof Manual switch on / off
	Laundry	Individual fan, ducted to façade or roof Manual switch on / timer off
Cooling system	Living areas	1-phase a/c, non-ducted. ≥ 2.5 star (average zone) + ceiling fans
	Bedrooms	No active cooling system. Ceiling fans to all bedrooms
Heating system	Living areas	1-phase a/c, non-ducted. ≥ 3 star (average zone)
	Bedrooms	No active heating system
Artificial lighting	All dwellings must be primarily lit (minimum 80% of light fittings) by compact fluorescent, fluorescent and LED lamps.	
Appliances	Cooktop & oven	Electric cooktop & electric oven

Table 3 *BASIX – Energy commitments – Central Systems and Dwellings*

Energy commitments – Common Areas		
Area	**Ventilation**	**Lighting**
Undercover car park areas	Supply + exhaust with CO monitor + VSD fan	LED with zoned switching and motion sensors
Lifts	n/a	LED, connected to lift call button
MSB	Tempered supply air only, thermostatically controlled	LED, manual on / off
Comms	Tempered supply air only, thermostatically controlled	LED, manual on / off
Bin room	Exhaust only, no efficiency measure required	LED with motion sensors
Community rooms	No mechanical ventilation	LED with motion sensors
Rainwater pump and treatment plant	Ventilation (supply + exhaust), thermostatically controlled	LED, manual on / off
Fire pump room	Ventilation (supply + exhaust), thermostatically controlled	LED, manual on / off
Bike Parking	Supply only with time clock or BMS controlled	LED with motion sensors
Bulky Mail / Mail	No mechanical ventilation	LED with motion sensors
Store	Supply only with time clock or BMS controlled	LED with motion sensors
Acc WC	Exhaust only, time clock or BMS controlled	LED with motion sensors
Ground floor lobby	No mechanical ventilation	LED with motion sensors
Hallways	No mechanical ventilation	LED with zoned switching and motion sensors

Table 4 *BASIX – Energy commitments – Common Areas*

Thermal Comfort Inclusions

Roof/Ceiling:

- Where neighbour above- No thermal insulation requirement
- Where outside air above- ≥R4.0 added insulation

External Walls:

- Where adjacent to outside air- ≥R2.5 added insulation

Internal Walls:

- Separating dwelling from common corridors and lift core/stairs- ≥R1.5 added insulation
- Separating dwellings from other dwellings- ≥R1.5 added insulation on each side
- All other internal walls- No thermal insulation requirement

Floors:

- Suspended floors (200mm) above external & non-conditioned areas- ≥R2.0 added insulation
- Suspended floors above neighbours or conditioned areas- No thermal insulation requirement

Floor Covering

- Timber everywhere except Bathroom. Tiles to Bathroom.

Glazing:

- All external glazing (total system) – ATB-005-03 B (U2.91 SHGC 0.44)

Ceiling fans:

- To be provided to living areas and main bedrooms.

Ceiling Penetrations:

- 1xExhaust per kitchen, sealed, 250mm
- 1xExhaust per bathroom, sealed, 250mm
- Downlights, sealed, 50mm- Zone Area<5m2: 1 downlight, Zone Area 5-10m2:2 downlights, Zone Area>10m2: 1downlight per 2.5m2

BASIX Materials Index

The new BASIX materials index will calculate and report on the embodied emissions of a home. The tool will do this by estimating the volume of different materials used in construction and applying the emissions factors for the materials.

The emissions factors represent embodied emissions from the production of each building material. Default factors for embodied emissions of materials are based on the EPiC database. Although the initial materials index does not account for the full lifecycle impact of building materials, we will consider other factors such as durability and transport of building materials in future revisions.

The embodied emissions calculations have been tested by many BASIX users, including builders adopting the higher standards ahead of 1 October 2023. This experience revealed a complex relationship between the thermal performance standard and embodied emissions. As a result, there will be no limit on embodied emissions of building materials when the policy commences on 1 October 2023. BASIX are consider setting a limit (or standard) in the future.

Please refer to BASIX certificate in Appendix A for further details on materials

6 Greenhouse Gas Efficiency and Material Resources

The following section describes how the project will 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.

6.1 Reduce Greenhouse Gas Emissions

To reduce greenhouse gas emissions our approach can be considered under a several sub groups which are as follows

- All-Electric Design
- Transport
- Refrigerants
- Operational Energy Consumption
- Materials

Please refer to Section 6.2 below for specific initiatives which relate to reduced operational energy consumption and section 6.4 for reduced material resources

6.1.1 All-Electric Design

The building has been designed to be all-electric and could be operationally at net-zero energy with a decarbonised grid or the procurement of Green Power (noting the uplift in cost of the latter and the impact this would have on affordable housing tenants).

6.1.2 Transport

The project is well located with multiple public transport options and many amenities close by. On-site bicycle parking facilities will be provided along with car share options overall reducing the use of private vehicles and the associated GHG emissions. The projects substation has also been sized for the potential integration of electric vehicles. In addition the project will look to source materials and labour from local sources where practical to reduce the GHG emissions associated with construction.

6.1.3 Refrigerants

Refrigerants can sometimes be overlooked in discussion of GHG emission, however many of the commercially available refrigerants for HVAC system have high Global Warming Potential (GWP) and the leakage from many of these systems is often underestimated. The project is considering whether air-conditioning will be required, with more detailed calculations required during design development. What we do know now if that each dwelling is performing well above the BASIX minimum requirements with ample external shading, operable windows and ceiling fans incorporated.

6.2 Reduce energy consumption

The following initiatives will be incorporated to reduce the energy consumption of the development.

6.2.1 Building Fabric

Exterior façade includes passive design solutions such as high levels of insulation, high performance glazing, external shading and responsible window to wall ratios have been calibrated through various iterations with the architect and NatHERS modelling. The project is achieving an average 7.6 stars, with the best performing dwelling reaching 8.8 stars.

6.2.2 Low-energy lighting

Artificial lighting consumes a significant part of a building's total electrical energy consumption. The lighting design will meet illumination power density as required by the NCC Section J. Energy-efficient LED lighting sources will be provided to increase the overall power efficiency and lower recurring cost.

Flexible switching systems, motion detectors and daylight sensors will be provided for control lighting where appropriate and economical.

6.2.3 Energy Metering and Monitoring

Electricity meters will be provided, and major services will be sub-metered as required by NCC Section J. Meters are to be located in easy access to facilitate regular monitoring and maintenance.

6.2.4 Renewable Energy

On-site rooftop solar Photovoltaic (PV) systems to be utilised in the proposed development with a PV array allowed for on each of the towers.

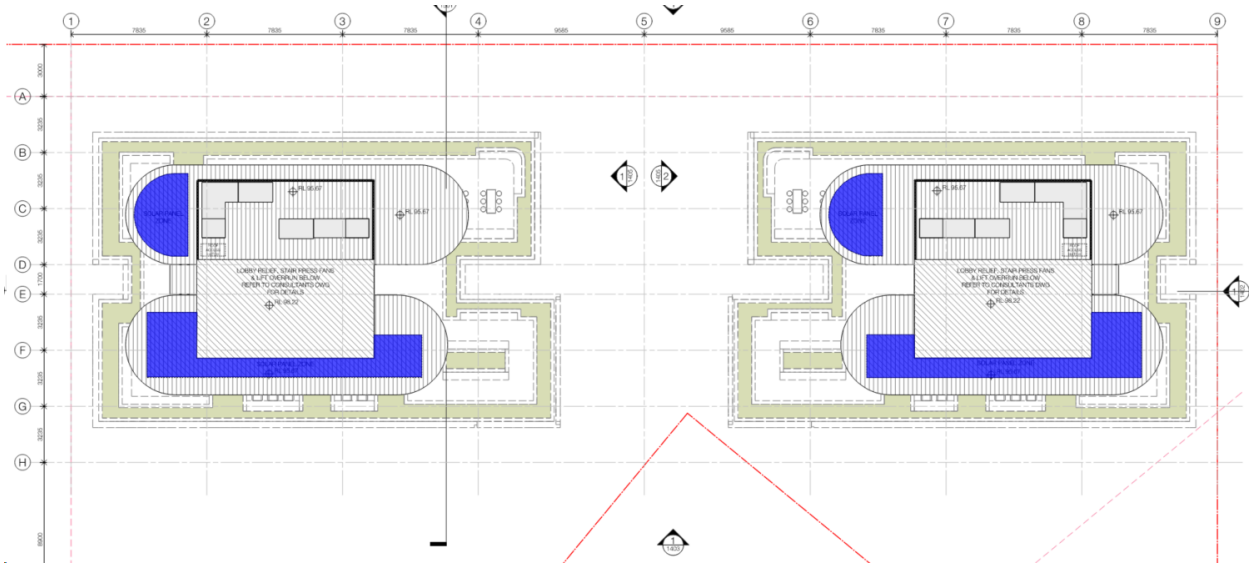


Figure 3 *Nominal locations of PV*

6.3 Reduce Water Consumption

The following initiatives will be incorporated to reduce the potable water consumption of the development.

6.3.1 Efficient Fixtures and Fittings

Highly efficient fittings and fixtures will be used throughout the development. Refer to Section 5 BASIX for nominated star ratings of each.

6.3.2 Rainwater Harvesting and Reuse

A rainwater tank of at least 20,000L has been included in the project and will be used for irrigation of all landscaping and 1 car wash bay.

6.3.3 Low water use landscaping

Native and/or low water use planting species will be used throughout the project.

6.4 Reduce Material Resources

6.4.1 Reduction of Embodied Energy and Life Cycle Impacts

A building's environmental footprint spans across all stages of the building life however often only energy within the building operation phase is considered. When considering the building construction phase, the energy associated with the processing, manufacture, and transportation of the building materials is a key component of the building's environmental footprint. This energy is called the material's embodied energy. Embodied energy is inherent within the material and cannot be changed after construction. The project team has committed to reduction in embodied emissions via the new BASIX materials category. In additional recycled and reuse materials will be investigated and adopted where practical.

Figure 4 *Reduction of Embodied Energy and Life Cycle Impacts*

6.4.2 Construction waste

Construction works can significantly impact the environment, particularly at a local level. These can arise from site disturbance, pollution, construction waste, water and energy use.

A target waste diversion percentage will be included in the contracture requirements for this project. A minimum of 90% of all demolition and construction waste (by mass) shall be recycled or reused. A Waste Management Plan that describes what materials will be reused on-site or separated for off-site recycling is a very effective way of reducing waste going to landfills and could be implemented by the Contractor.

6.4.3 Operational waste

Adequate provisions will be made for the management and collection of the following waste streams (as applicable):

- general waste
- paper and cardboard
- co-mingled recycling
- food organics
- hard/bulky waste
- e-waste.