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25 JULY 2024

RENYi

AUSTRALIAN ENGINEERING CONSULTANTS
FOR SUSTAINABLE BUILDINGS

SUSTAINABILITY REPORT

TUMBI UMBI RETIREMENT VILLAGE12-14 MINGARA DRIVE, TUMBI UMBI

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General Comments:

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The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

Computer assessment and calculations in this report provides only an opinion of the building performance. This opinion is based on a necessarily simplified and idealised version of the building that does not and cannot fully represent all of the intricacies of the building once built. As a result, simulation results only represent an interpretation of the potential performance on the building. No guarantee or warrantee of building in practice can be based on simulation results alone. An official assessment in operation is recommended.

Draft reports are not to be used ”For Construction” stage of any projects. Only Final reports are deemed valid construction documentation for project certification purposes. Please contact RENYI for status of report issued.

Contents

1. EXECUTIVE SUMMARY 1
2. RESPONSE TO SEARS, SEPP AND EPA REGULATION 2
3. PROJECT BACKGROUND 6
3.1. OVERVIEW 6
3.2. OBJECTIVES 6
4. ENERGY EFFICIENCY 7
4.1. OBJECTIVES 7
5. WATER EFFICIENCY 15
5.1. OBJECTIVES 15
6. STORMWATER MANAGEMENT 17
6.1. OBJECTIVES 17
7. INDOOR ENVIRONMENT QUALITY (IEQ) 19
7.1. OBJECTIVES 19
9. WASTE MANAGMENT 22
9.1. OBJECTIVES 22
10. URBAN ECOLOGY 24
10.1. OBJECTIVES 24
11. BUILDING MATERIALS 25
11.1. OBJECTIVES 25
12. BUILDING MANAGEMENT 26
12.1. OBJECTIVES 26
APPENDIX A : Net Zero Statement A-1

1. EXECUTIVE SUMMARY

This report provides an overview of the sustainability initiatives considered for the development application of the proposed TUMBI UMBI RETIREMENT VILLAGE 12-14 MINGARA DRIVE, TUMBI UMBI. This report covers both stage of the construction.

The project will be targeting the following mandatory ratings and requirements:

- NSW BASIX Compliance requirements for the class 2 dwellings and class 9C assisted living apartments.
- NCC 2022 Section J compliance requirements for the common areas and shared facilities area.
- State Environmental Planning Policy (Sustainable Buildings) 2022
- Secretary's Environmental Assessment Requirements (SEARS).

Note: The project is not seeking a certified Green Star rating.

In additional to achieving the above targeted compliance ratings, 8 key sustainability criteria are also evaluated with aim to improve the overall environmental performance of the development with aim to align with the Central Coast Council Development Control plans 2022.

The following table summarises the initiatives which have been considered in-line with the above criteria.

TABLE 1:- SUMMARY OF ESD INITIATIVES CONSIDERED FOR THIS DEVELOPMENT

1. ENERGY EFFICIENCY	▪ High performance building fabric. ▪ External shading. ▪ High efficacy (Lumens/Watt) luminaires. ▪ Highly efficient Air-conditioning system. ▪ High efficiency vertical transport systems. ▪ High energy star appliances.
2. WATER EFFICIENCY	▪ High WELS rating water fixtures and appliances ▪ Low water-dependent landscaping. ▪ Rainwater harvesting and reuse for toilet flushing, wash-down areas andirrigation.
3. STORM WATER MANAGEMENT	▪ Minimised impact of Stormwater run-off to Mains. ▪ Undertake MUSIC modelling.
4. INDOOR ENVIRONMENT QUALITY	▪ Access to natural ventilation & daylight. ▪ Improved Thermal Comfort
5. WASTE MANAGEMENT	▪ Consolidated and separated waste storage areas. ▪ Storage area away from occupied spaces to prevent exposure to foul odours. ▪ Comprehensive waste strategy plan.
6. URBAN ECOLOGY	▪ Maximise green landscaping and usable community outdoor spaces. ▪ Improve access to communal facilities and outdoor space (i.e., gym, parks etc).
7. MATERIALS	▪ Use of Low embodied energy materials. ▪ Use of Low pollutant emissions materials.
8. CONSTRUCTION AND BUILDING MANAGEMENT	▪ Reduced construction waste. ▪ Adequate energy and water metering.

2. RESPONSE TO SEARS, SEPP, AND EPA REGULATION

This report addresses the Secretary's Environmental Assessment Requirements (SEARs-9) – Ecological Sustainable Development (ESD) as well as the requirements of the Sustainable Buildings SEPP 2022 and EPA Section 193 regulation . The requirements and the associated responses are outlined in the following table 2 and 3 below, along with corresponding references to sections within this report.

TABLE 2: SEARS REQUIREMENTS AND RELEVANT RESPONSE

SEARs Requirements	Project Response and reference in Report
SEAR 9 - Ecologically Sustainable Development (ESD)	
Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.	The ESD initiatives proposed for the project aim to reduce the environmental impacts typically associated with buildings during construction and ongoing operation. The project utilises a resource conservation approach for energy, water, and materials, with an emphasis on reducing environmental impacts. Refer to 4 to 12 of this report, for details. The outcome of the resource conservation approach in this report, is to ensure that the project aligns with the principles of ecologically sustainable development (Section 193) of the Environmental Planning and Assessment Regulation 2021. **Refer to Section 4 to 12 of this report, for details.**
Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	The project is targeting to meet BASIX and NCC Section J requirements which are recognised industry performance standards. In addition, the project is also looking at meeting design standards as listed in Section 4 to 12 of this report. These standards are typically referenced in the Green Star design manual. **Refer to Section 4 to 12 of this report, for details.**
Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	The minimisation of Greenhouse gas (GHG) emissions, conservation and consumption of energy, water and material resources are demonstrated in Section 4, 5 and 10 of this report. **Refer to Section 4, 5 and 10 of this report, and the net-zero statement (included in Appendix-A)**

TABLE 3: SUSTAINABLE BUILDINGS SEPP REQUIREMENTS AND RELEVANT RESPONSE

Section 3.2(1) Of the State Environmental Planning Policy (Sustainable Buildings) 2022 (Sepp)	Project Response
Demonstrate how the proposed new development is designed to enable the following— • the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials, • a reduction in peak demand for electricity, including through the use of energy efficient technology, • a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design, • the generation and storage of renewable energy, the metering and monitoring of energy consumption, • the minimisation of the consumption of potable water.	• A Construction & Demolition Waste Management Plan (WMP) report will be developed for the project. This report will be submitted at DA stage. **See Section 9.** • The project has allowed for the installation of 120kW PV system. **See Section 4.** • The project is designed to comply with the NCC 2022 Section J Energy Efficiency Requirements. **See Section 4.** • The Façade and services system have been proposed to reduce the energy consumption to meet the NCC 2022 Section J DTS and BASIX requirements. **See Section 4.** • The VRF air-conditioning system has been designed to allow for a space-by-space user-activation of the cooling/heating, thereby minimising energy consumption. **See Section 4.** • All energy and water systems will have energy and water meters and will be monitored as a mandatory NCC 2022 requirement under Part J9D3. **See Section 4 and 5.** • The sanitary fixtures and fittings used in the project such as taps, showerheads, toilets, zip taps, dishwashers etc will be certified under the Water Efficiency Labelling and Standards (WELS). • Rainwater Collection and reuse to include landscape irrigation. **See Section 5**

TABLE 4: PROJECT RESPONSE TO SECTION 193 OF THE EP&A REGULATION 2021

Principle	Project Response
The Precautionary Principle 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. Decisions should be guided by: 1. Careful evaluation to avoid, wherever practicable, serious, or irreversible damage to the environment. 2. An assessment of the risk-weighted consequences of various options.	The site is currently vacant, largely cleared of vegetation (except for grasses and small shrubs). The landscape strategy by the project team has been developed to enhance the environmental performance of the land to meet or improve beyond its existing condition , including integration of native plant species and incorporation of water sensitive urban design features to passively manage storm water across the site and enhance biodiversity. Relevant studies to address all SEARs and all statutory provisions in all relevant planning policies, including the Biodiversity Conservation Act 2016, and relevant SEPPs will further support this principle.
Inter-Generational Equity The present generation should ensure that the health, diversity, and productivity of the environment are maintained or enhanced for the benefit of future generations.	The project will minimise the impact on the environment through: Resource efficiency measures and selected low embodied carbon materials and using recycled materials where possible. Energy, water and waste reduction and conservation measures to reduce consumption of resources. Landscape strategies and Water Sensitive Urban Design (WSUD) features to enhance biodiversity and the site's ability to passively control stormwater. Connection to country – Integration of Indigenous and Aboriginal design considerations and features where relevant.
Conservation of Biological Diversity and Ecological Integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.	The site is vacant, and the proposed landscape strategy has been developed to enhance the environmental performance of the land to meet or improve beyond its existing condition which includes integration of native plant species.
Improved Valuation, Pricing, and Incentive Mechanisms Environmental factors should be included in the valuation of assets and services, such as: • Those who generate pollution and waste should bear the cost of containment, avoidance, or abatement, • 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, • Environmental goals, having been established, should be pursued in the	Strategies for the project are developed to achieve the highest sustainability and environmental performance in alignment with recognised industry ESD standards, while aiming to remain within budget and minimise high costs. Several environmental initiatives will contribute to reduction of energy, water, and Greenhouse gas (GHG) emissions, which will have positive impact on the project's operational cost. Life Cycle Costing will be used and considered by the project team throughout the design process to justify capital investment and reduce ongoing impacts on economic sustainability.

most cost-effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.	

3. PROJECT BACKGROUND

3.1. OVERVIEW

The proposed development would consist of the following:

- 13 two-storey Townhouses each with 4 units - Namely V1 to V13.
- Building 1 – 6 Storey – 36 units.
- Building 2 – 7 Storey – 15 units
- Building 3 – 7 Storey – 44 units
- Building 4 – 6 Storey – 72 units
- Total GFA = 31,797.8 sqm
- Site Area = 29,957.5 sqm

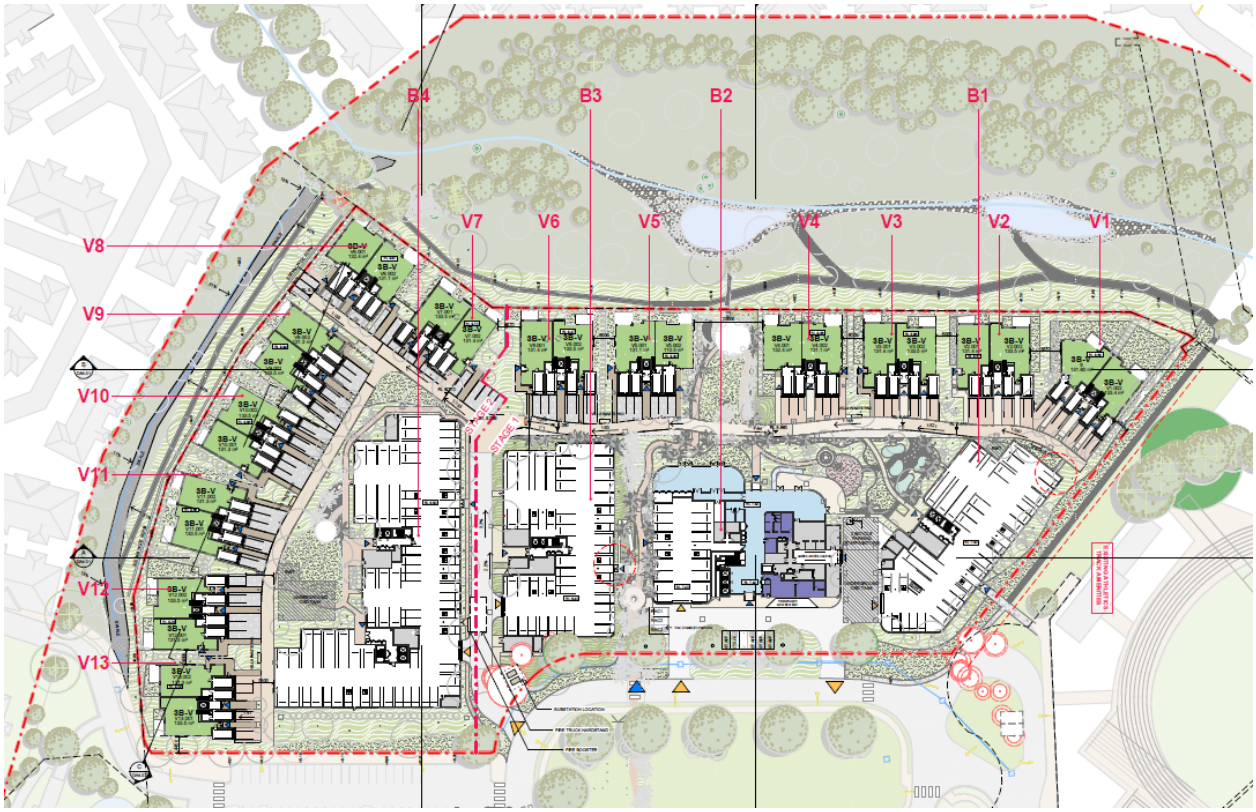


FIGURE 1: SITE LOCATION OF PROPOSED DEVELOPMENT

3.2. OBJECTIVES

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

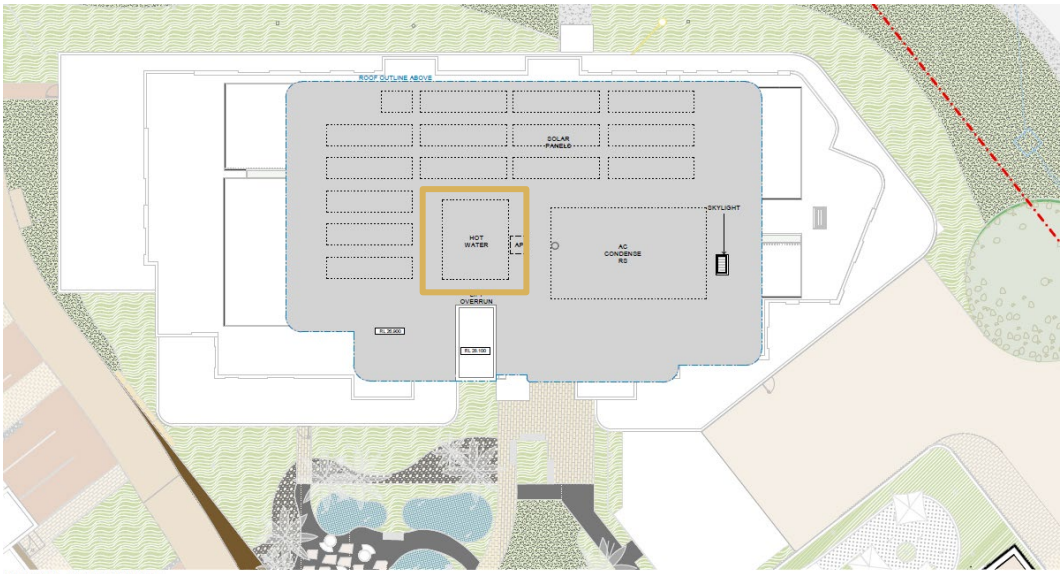
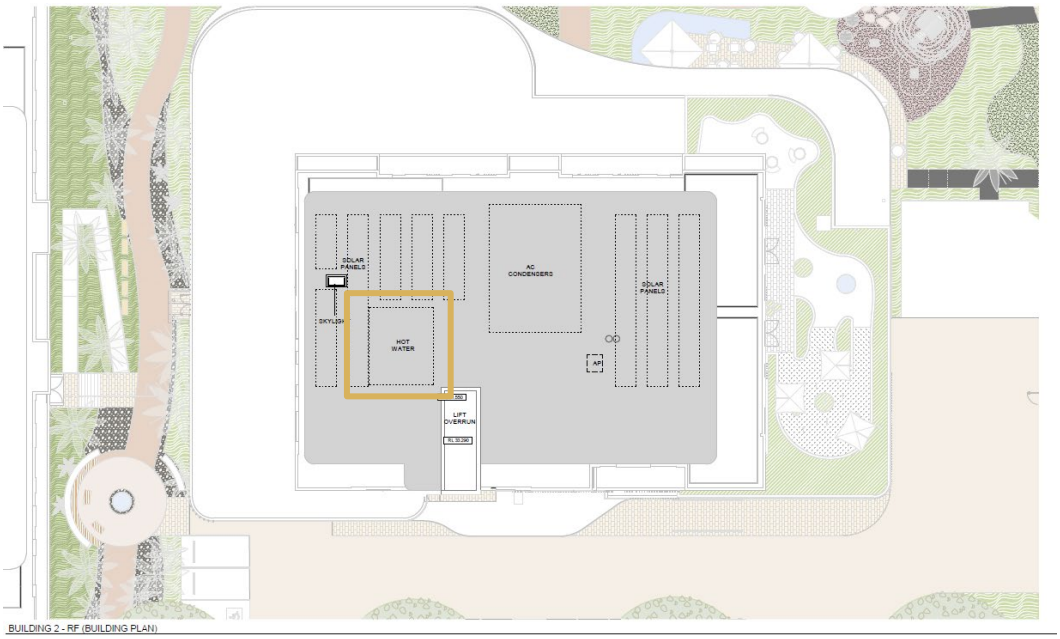
- Reduce energy and water consumption.
- Reduce the ecological footprint of the building and its occupants.
- Improve thermal comfort and indoor air quality.
- Improve occupant well-being.
- Enhance liveability of the development.

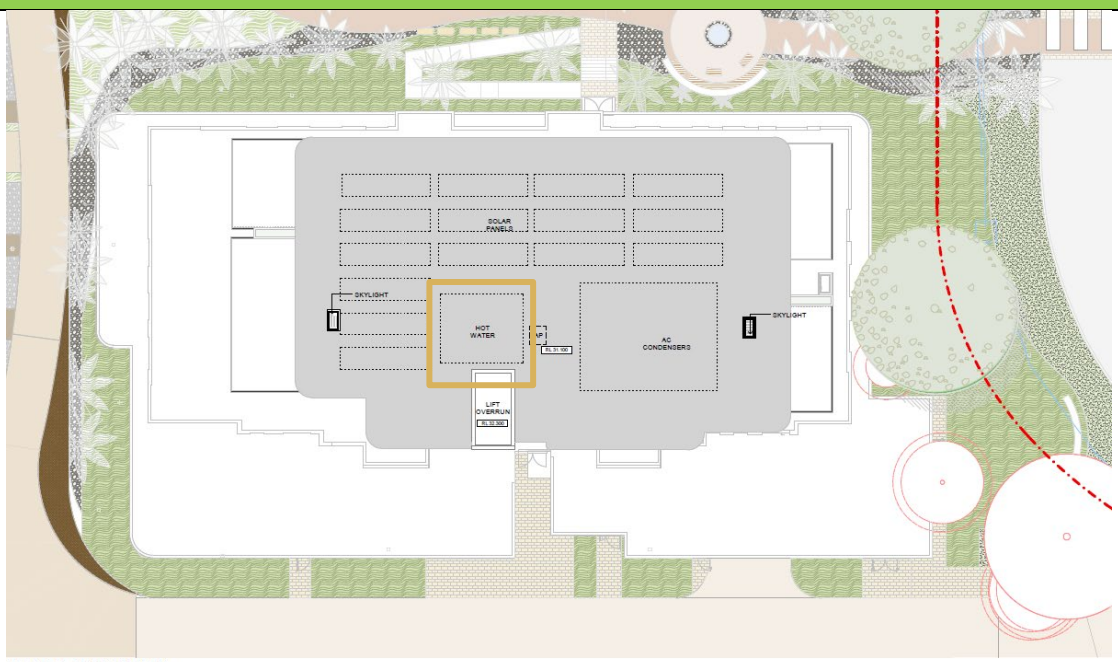
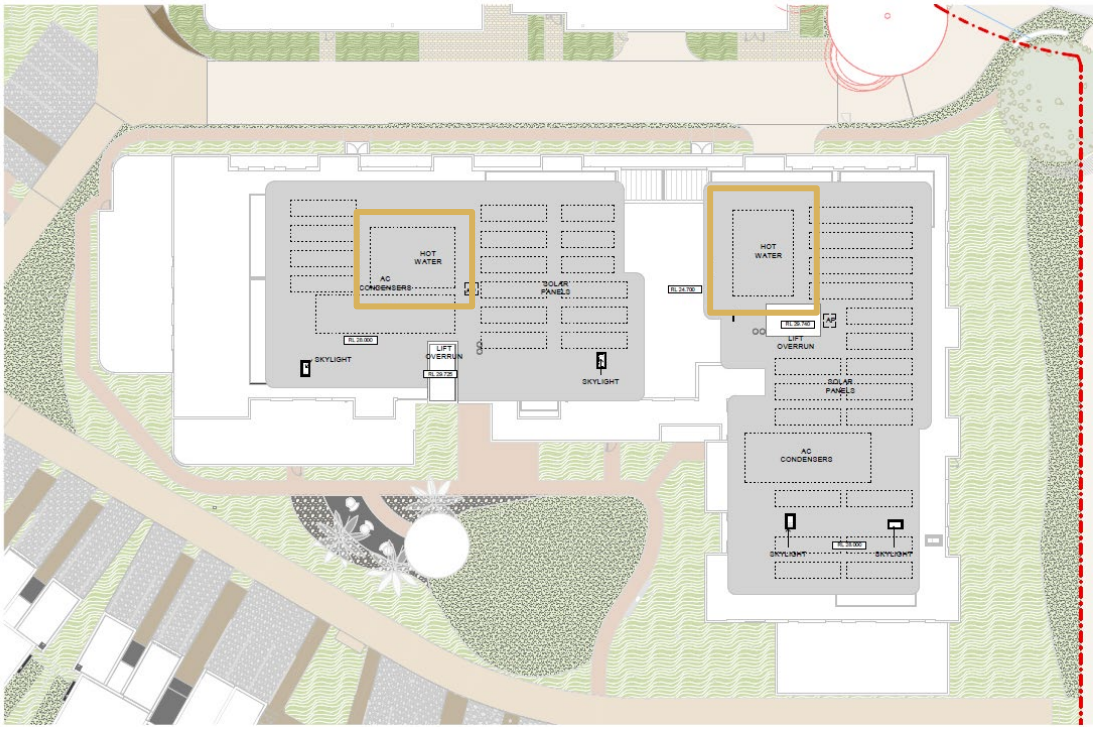
4. ENERGY EFFICIENCY

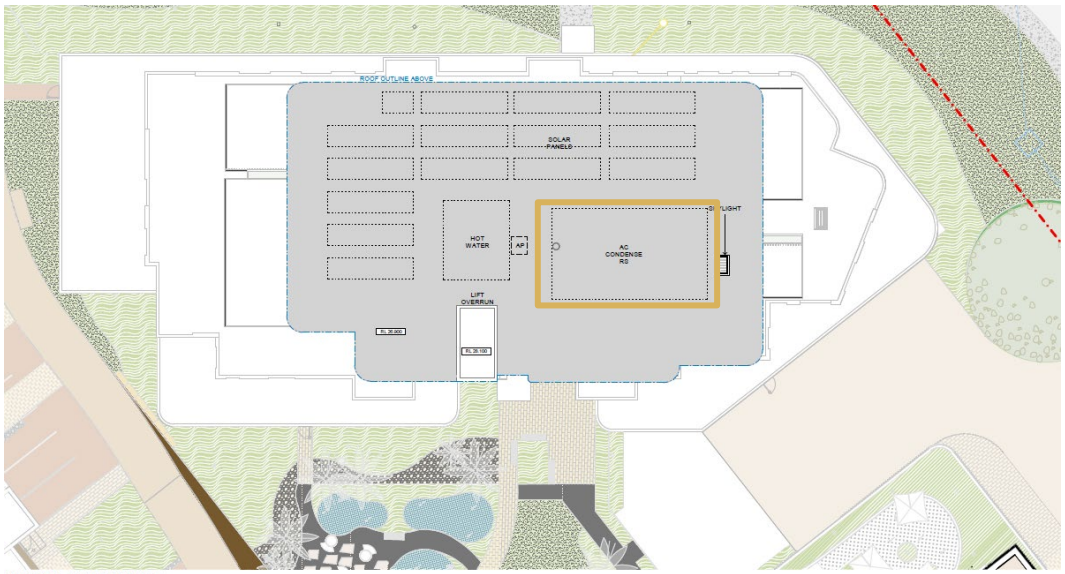
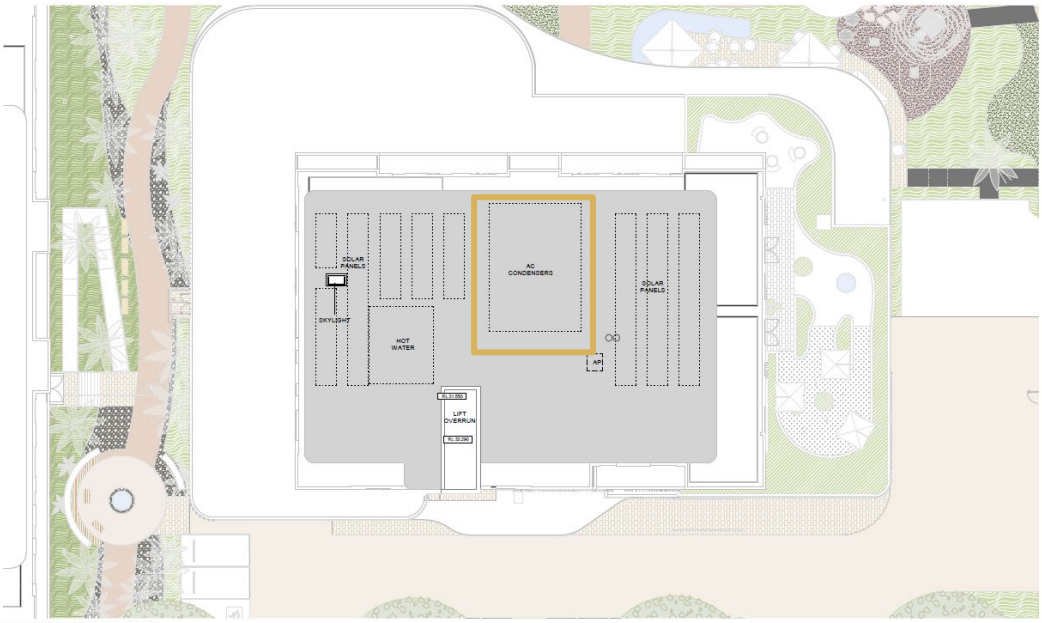
4.1. OBJECTIVES

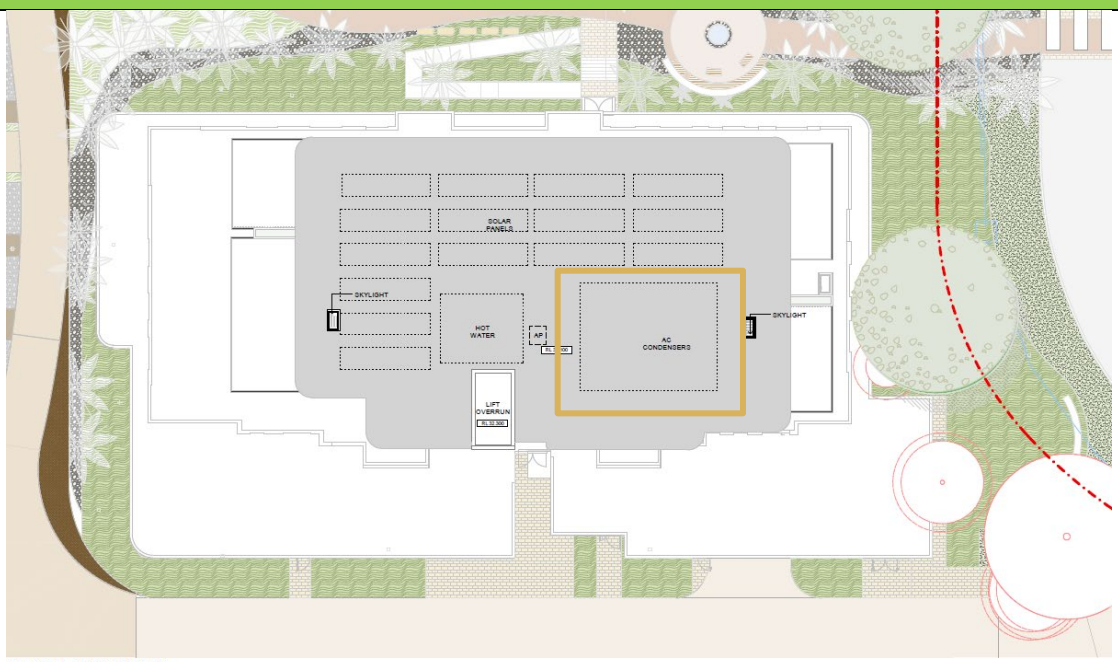
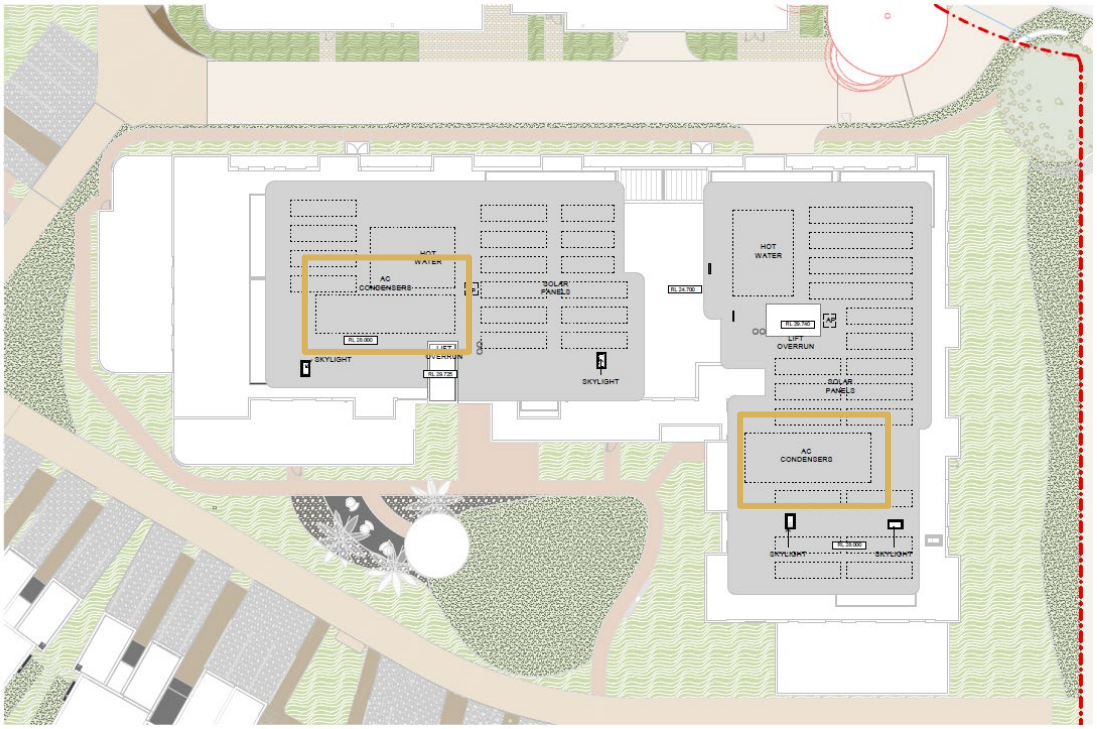
- To use energy efficiently.
- To minimise total operating greenhouse emissions.
- To minimise energy peak demand through design – for example, orienting the building appropriately, shading glazed surfaces, optimising glazing to exposed surfaces, allocating space for solar panels and external heating and cooling systems.
- To minimise associated energy costs.

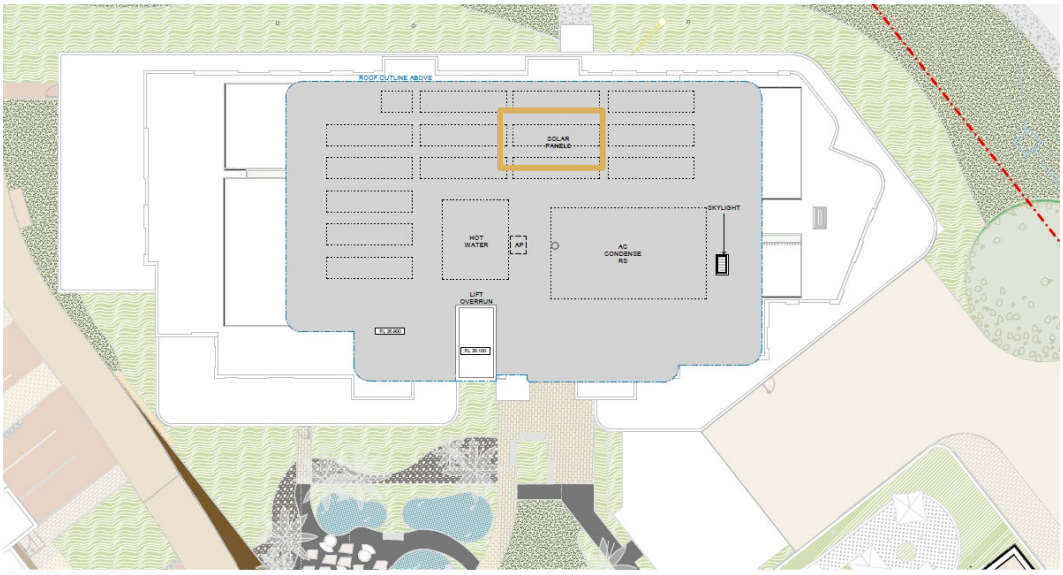
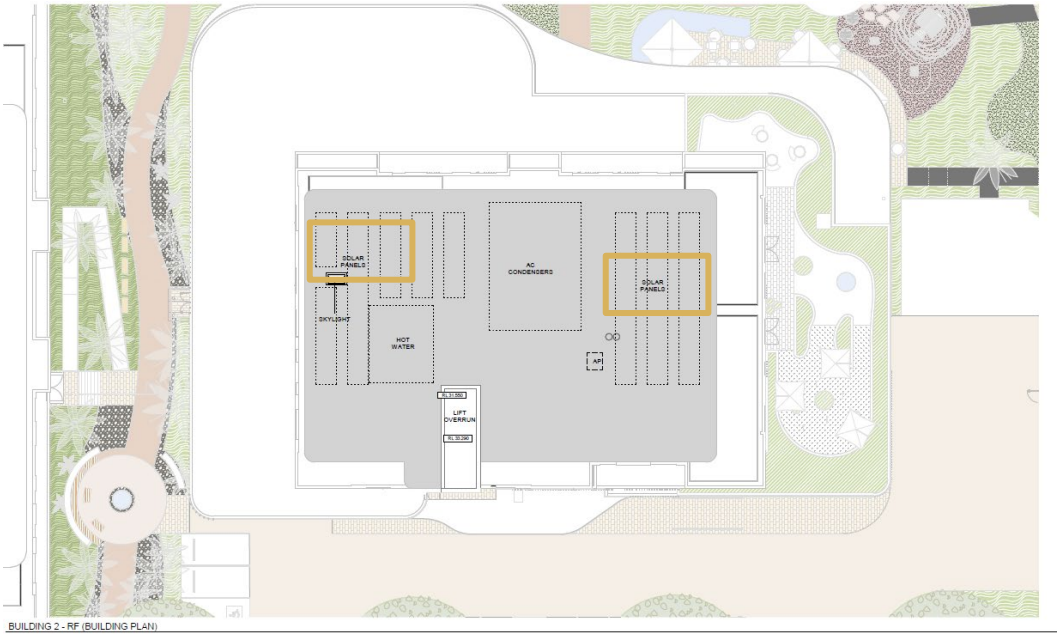
Issues	Design Responses
BCA and BASIX efficiency requirements met	The Project is aiming to achieve minimum BASIX Energy scores (NCC 2022 criteria): • **Energy – 63 min points of 100.**
Building fabric and Glazing	Min added R2.0 insulation to external walls (Class2). Min added R1.5 insulation to internal walls (R2.0 acoustic insulation for wall next to plant room) and exposed floor. (Both Class 2 and 9c). Min added R3.0 insulation to the roof to Class 2 dwelling. Window system – Single and Double glazed combination with tinting/LowE glazing system (in-lieu of Monolithic LowE glass) -(Both Class 2 and 9c).
Efficient shading	Balcony overhangs are provided as primary shading to the buildings. Shading helps minimise the solar heat into the apartments which has resulted in the meeting the JV15 heating and cooling loads compliance requirements. 

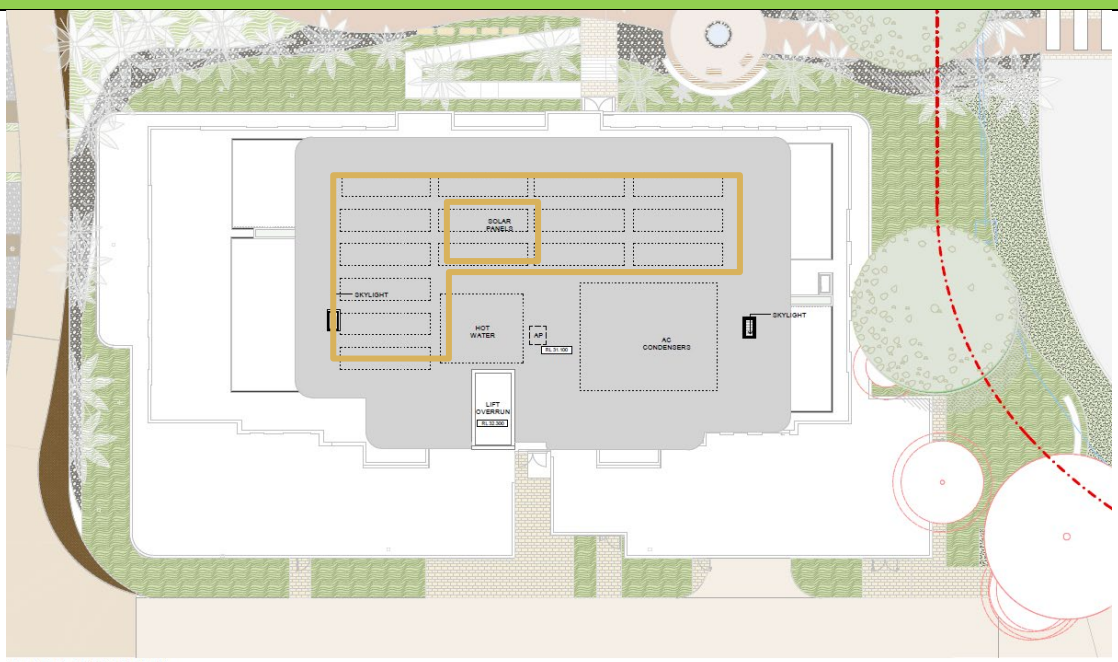
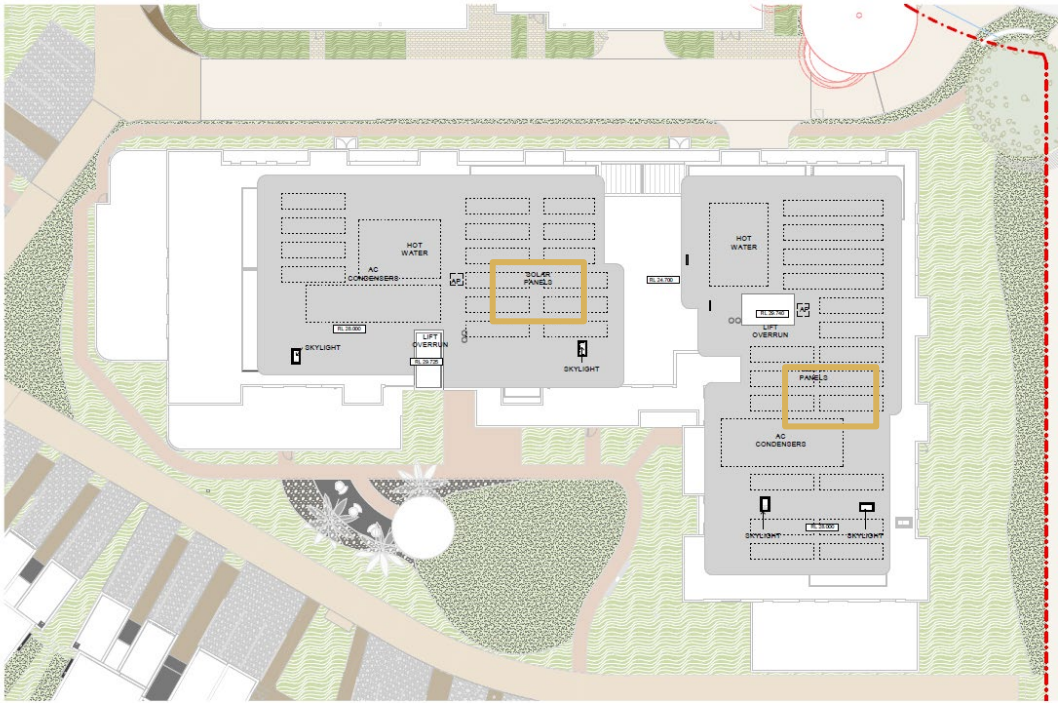
Issues	Design Responses
Hot water system	The Central hot water unit (HWU) for each building would be powered by electricity (no fossil fuel) with R1 insulation added to the ring main & supply piping/risers. It has been proposed that the selection of the HWU efficiency would aim to be at least one star within the best available in the market and suitable for the project. (Go to www.energyrating.gov.au for more information). Central Hotwater Plant area for Building 1 to 4 as shown below.  BUILDING 1 - RF (BUILDING PLAN)  BUILDING 2 - RF (BUILDING PLAN)

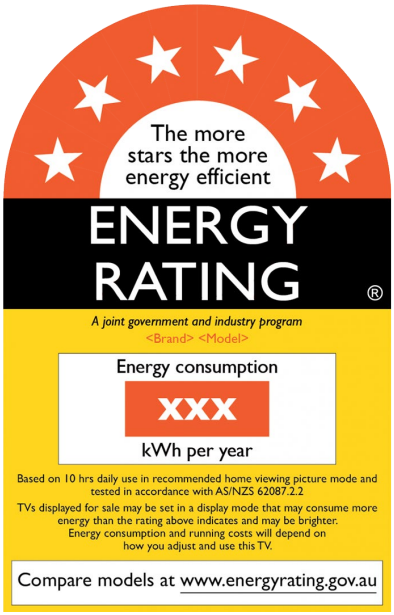
Issues	Design Responses
	 BUILDING 3 - RF (BUILDING PLAN) 

Issues	Design Responses
Efficient heating and cooling system	It has been proposed that the development would be served by a central air-cooled Variable-Refrigerant - Volume (VRV) system for its heating and cooling requirement. This system type would have an Energy Efficiency Rating of 3.5 to 4.0 for heating and 3.0 to 3.5 for cooling as specified in the BASIX certificate. AC Condenser Plant area for Building 1 to 4 as shown below.  BUILDING 1 - RF (BUILDING PLAN)  BUILDING 2 - RF (BUILDING PLAN)

Issues	Design Responses
	  The Ground floor lobbies and hallways on each level are to be naturally ventilated.
Mechanical ventilation system.	Building 1,Building 2 Building 3, and Building 4 have naturally ventilated carpark spaces. The mechanical plant rooms are to be ventilated by supply air fans linked to light switches.
Efficient lighting	It has been proposed that energy efficient LED lighting fixtures will be used throughout the development with Lux levels complying with AS1680.1.

Issues	Design Responses
	The LED lighting to the carpark, garbage room, storage rooms, hallway, common areas, and ground floor lobby areas will be zoned, and motion sensor controlled. All mechanical/electrical plant rooms will be on manual on/off switches.
Onsite Electricity generation	An estimated 120KW photovoltaic system has been proposed for the project. Dedicated roof area on the buildings of approximately 900 sqm has been allocated for Solar PV installation. It is anticipated that the PV would facilitate in reducing the daily peak electricity demand of the whole development.  BUILDING 1 - RF (BUILDING PLAN)  BUILDING 2 - RF (BUILDING PLAN)

Issues	Design Responses
	 BUILDING 3 - RF (BUILDING PLAN) 

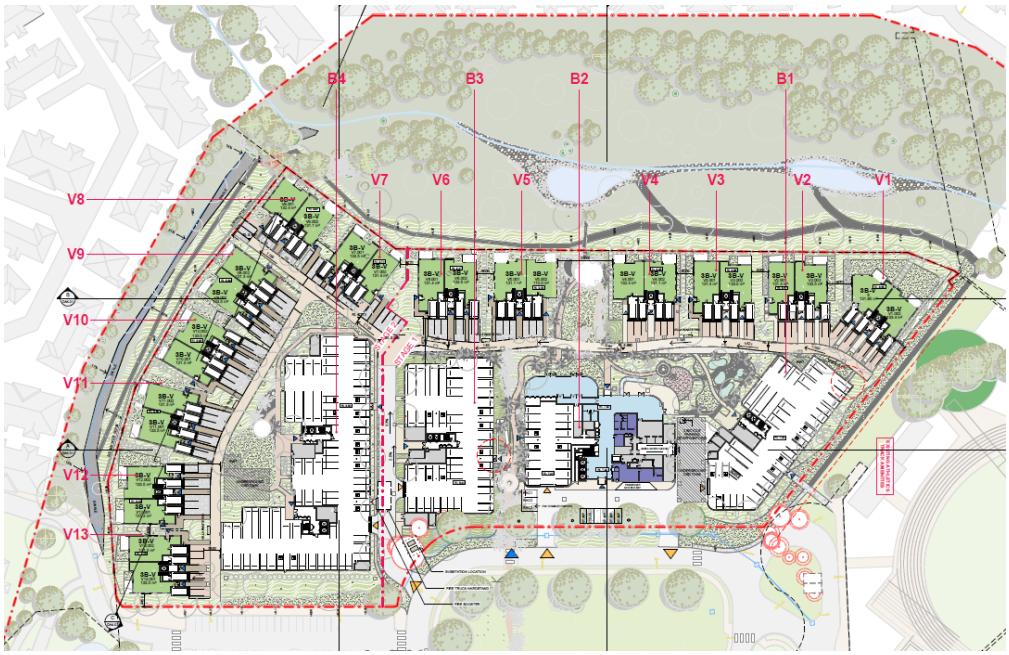
Issues	Design Responses
Energy Efficient Appliances	It has been proposed that each apartment would be supplied with the following min star rating appliances: • Min 4 Star Dishwasher. It is the intent of the project team to select efficient appliances that would be at least one star within the best available in the market and suitable for the project. (Go to www.energyrating.gov.au for more information). 
Lifts	Gearless traction with VVVF motors has been proposed for the lift systems serving the development.
Swimming pools	NA
Metering	The metering strategy is to meet minimum NCC 2022 Part J9 Requirements

5. WATER EFFICIENCY

5.1. OBJECTIVES

- To efficiently use water.
- To minimise total operating potable water use.
- To collect and reuse rainwater and stormwater.
- To use alternative water sources appropriately – for example, grey water.

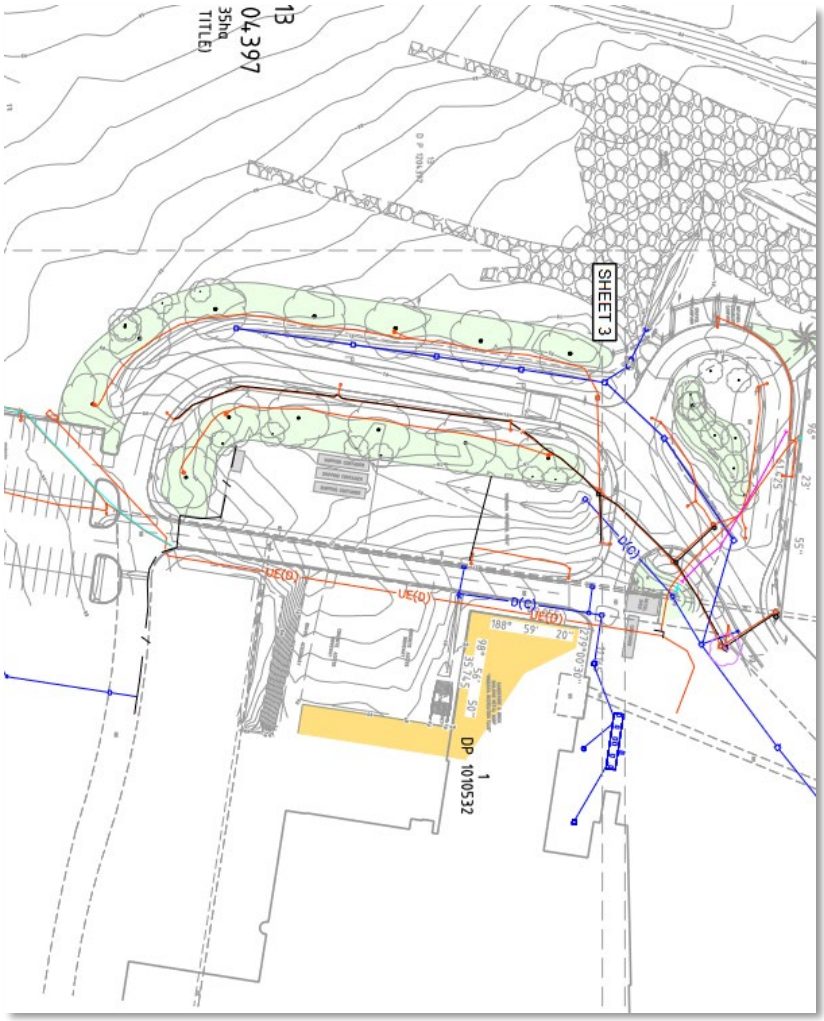
Issues	Design Responses
BCA and BASIX efficiency requirements met.	The Project is aiming to achieve the following BASIX water scores (NCC 2022 criteria): • **Water – 50 min of 100 points.**
High Water efficiency rating of water fixtures and appliances	Showerhead less than or equal 7.5L/min water rating. Toilets 4 Star WELS rating. Kitchen Taps 5 Star WELS rating. Bathroom Taps 5 Star WELS rating. Dishwashers 3.5 Star WELS rating. Clothes Washer 4 Star WELS rating. This initiative would aim to reduce potable water consumption. 
Rainwater tanks/Stormwater reuse	A total 60KL rainwater tank (2 x 30KL rainwater tanks) has been proposed for the project and the harvested water would be used mainly for landscape irrigation and toilet flushing.

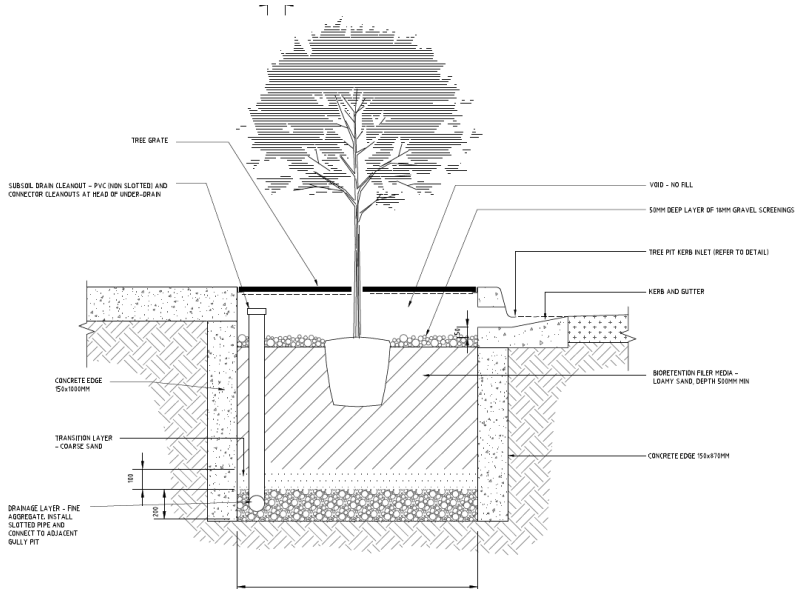
Issues	Design Responses
Water efficient landscaping and irrigation	It has been proposed that the landscape would aim to use mainly locally indigenous or ''1-drop'' plants with approximately 3790 sqm of lawn areas and 3790 sqm of plantings. This initiative would reduce potable water consumption. **Site Landscape** 
Water meter	It has been proposed that each apartment will be allocated a water meter. The common areas will be sub-metered to account for water usages.
Fire Sprinkler	It has been proposed that the fire sprinkler test water would be reused in a closed loop system.
Swimming pools	NA

6. STORMWATER MANAGEMENT

6.1. OBJECTIVES

- To reduce the impact of stormwater runoff.
- To improve the water quality of stormwater runoff.
- To meet best practice standards for managing stormwater.
- To incorporate Water Sensitive Urban Design principles, including stormwater reuse.

Issues	Design Responses
Site permeability	The total site area is approximately 29957.5 sqm. 
Impervious surfaces and their related treatments	The impervious surfaces would include the building site plus the hard surface landscape. The hard surfaces would mostly consist of paving tiles and bitumen paving. It is anticipated the design layout (with angled pitfalls etc) would aim to direct all stormwater towards a below ground pit and pipe system prior to discharging nearby waterway/river system, further coordination with relevant consultant will be conducted on stormwater treatment.

Issues	Design Responses
	The rainwater/stormwater from the roof of the building would be directed to the rainwater tank and pervious landscape with aim to reduce stormwater runoff. Please refer to Civil Engineering Report: Stormwater Management report for more information.
Total number and area of pervious surfaces (detention through on-site filtration)	The pervious surfaces would consist of porous paving, gardens, rain gardens and swales. Include size, area of runoff and location on plans. It is anticipated the pervious surface would help retain/minimise stormwater runoff and later directing all stormwater towards the main catchment area before discharging into nearby stormwater system. 
Provide additional STORM calculations	A MUSIC (Model for Urban Stormwater Improvement Conceptualisation) analysis will be undertaken by relevant consultant to ensure that the water sensitive urban design has been incorporated into the project.

7. INDOOR ENVIRONMENT QUALITY (IEQ)

7.1. OBJECTIVES

- To achieve a healthy indoor environment quality for building occupants using fresh air intake, cross ventilation, and natural daylight.
- To achieve maximum thermal comfort with minimal mechanical heating, ventilation, and cooling.
- To reduce indoor air pollution by using low-toxic materials.
- To minimise reliance on mechanical heating, ventilation, cooling, and lighting systems.
- To minimise noise levels and noise transfer within and between buildings and associated external areas.

Issues	Design Responses
Daylight	The glazing to external wall ratio for this development is approximately 50-58% on average. It is anticipated that this would facilitate natural daylight penetration into the habitable space of each apartment. 
Natural ventilation	Each apartment is designed to be naturally ventilated for approximately 65 to 70% of the year with openable balcony sliding doors and awning sash windows on the external façade when the ambient conditions are appropriate.

Issues	Design Responses
	 Typical window opening configurations are modelled in the J1V5 simulation software to be as below: • Sliding doors – 45% • Awning = 10% with restrictor
Thermal comfort	Each habitable space will be sufficiently insulated as per NCC 2022 J1V5 modelling specifications: • Min added R2.0 insulation to external walls (Class2). • Min added R1.5 insulation to internal walls (R2.0 acoustic insulation for Walls next to plant rooms) and exposed floor. (Both Class 2 and 9b). • Min added R3.0 insulation to the roof to Class 2 Dwelling • Window system – High performance glazing with tinting/LowE glazing system -(Both Class 2 and 9b). In additional supplementary Air-conditioning VRV system would be provided to ensure thermal comfort would be achieve throughout the year.
Reduced VOC (Volatile Organic Compounds) and formaldehyde	Building materials and finishes with low levels of VOC and formaldehyde limits would be proposed/considered for the project. Example paints, adhesive, and joinery to meet relevant industry standards such as Green Star or others etc.

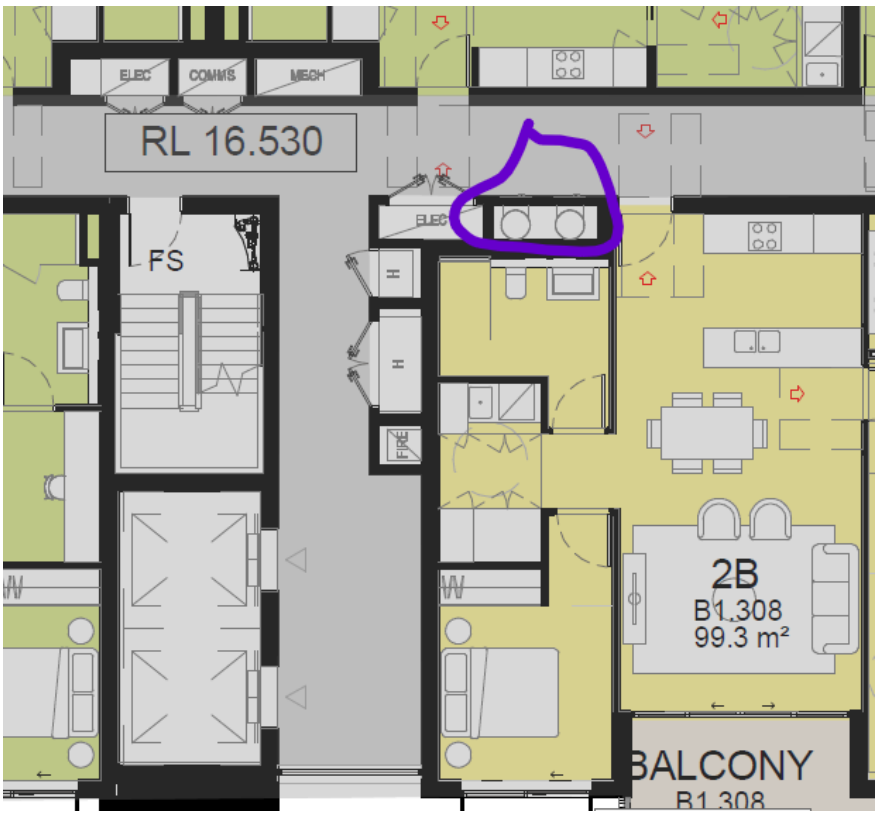
Issues	Design Responses
	

9. WASTE MANAGMENT

9.1. OBJECTIVES

- To minimise waste and encourage reuse and recycling during design, construction, and operation.
- To ensure long-term reusability of building materials.
- To allow sufficient space for future waste management changes, including (where possible) composting and green waste facilities.

Issues	Design Responses
Storage spaces for recycling and general waste	The proposed waste management plan would aim to meet the following: 1. 45.7 sqm Bin Room in building 1 2. 45.9 sqm Bin Room in building 2 3. 55 sqm Bin Room in building 3 4. 43.6sqm Bin Room in building 4 The waste rooms will be designed to accommodate sufficient bins for the development based on twice week frequency for general rubbish and twice weekly frequency for recycling waste. The waste stream would consist of comingled recycling bins and general waste. Residents on each level would discard their general waste via the chute and deposit their recycling waste in the holding area/room on each floor.
Construction waste management plan	A Construction & Demolition Waste Management Plan (WMP) report will be developed for the project. This report will be submitted at DA stage. The Information to be provided in the WMP will include a wide range of construction and demolition waste management guidance at the local, state, and federal levels. The primary sources of guidance include: • Central Coast Council Waste Management Guidelines for New Development Applications (2016). • Australian Government, Department of Sustainability, Environment, Water, Population and Communities. Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain. (2014, November). • NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021 • NSW Waste Classification Guidelines 2014 • Australia's National Waste Policy 2018 To quantify and measure this sustainable approach to waste management, the NSW WARR Strategy 2014-2021 outlines specific targets to clarify the state's long-term goals and priorities. These targets were supported by industry, community, state, and local governments during the Strategy's consultation phase, and include: • Increasing construction and demolition recycling rates to 80% • Increasing waste diverted from landfill to 75% • Reducing litter by 40% • Reduce illegal dumping incidents by 30%

Issues	Design Responses
	The Main Contractor will aim to achieve where practical, best practice waste management plan during demolition and construction stages of the development: • Re-use of excavated material on-site and disposal of any excess to an approved site. • Green waste mulched and re-used on-site as appropriate or recycled off-site. • Bricks, tiles and concrete re-used on-site as appropriate, or recycled off-site. • Plasterboard waste returned to supplier for recycling. • Framing timber re-used on site or recycled off-site. • Windows, doors, and joinery recycled off-site. • All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with Work Cover Authority and EPA requirements. • Plumbing, fittings, and metal elements recycled off site. • Ordering accurate quantities of materials and prefabrication of materials where possible. • Re-use of formwork. • Careful source separation of off-cuts to facilitate re-use, resale, or recycling.
Operation waste management plan	A two-chute system, comprising general waste chutes would be installed with access provided on each residential level for each building core. 

10. URBAN ECOLOGY

10.1. OBJECTIVES

- To protect and enhance biodiversity within the municipality.
- To provide environmentally sustainable landscapes and natural habitats, while minimising the urban heat island effect.
- To retain significant trees.
- To encourage planting of indigenous vegetation.
- To create space for productive gardens, particularly in larger residential developments.

Issues	Design Responses
Landscaped areas to be designated.	The current site is a greenfield zone with few trees and minor biodiverse fauna.  The new site area has been designed to provide a better landscape environment compared to the previous turfed greenfield area. The project would provide more trees, biodiverse, native, and fostering fauna's habitation with aim to enhance the site area.
Heat Island control	The new landscape area has been designed to include larger green vegetation area with minimum hardscape with aim to reduce heat island effect. It is the intention of the landscape designer to ensure that exposed hardscape will be shaded by tree canopies where appropriate. Please refer to the Landscape Design Report for more information.

11. BUILDING MATERIALS

11.1. OBJECTIVES

- To minimise environmental impact by using materials with a favourable lifecycle assessment.

Issues	Design Responses
Retention of existing structure and materials	There are no existing structures onsite where the building materials can be recovering and reuse.
Reduced Portland cement Concrete	The project would aim to use reduced Portland cement concrete to the main structure of the development. E.g., Concrete with min 15% to 20% fly ash replacement. In additional the project would aim to use concrete where the mix water contains at least 50% reclaimed water and at least 25% of fine aggregate(sand) are manufactured sand or other alternative materials by mass.
Responsible reinforcing steel.	The project would aim to use min 90% of steel (by mass) sourced from a responsible steel maker. E.g., a steel maker that adopts Energy-reducing process to make reinforcing steel.
Sustainable timber	The project would aim to use min 90% (by cost) of timber that is either reuse or are PEFC or FSC certified and comes with a Chain-of-Custody. Typical timber uses include, but are not limited to: • Formwork and other temporary installations of timber (e.g., hoardings). • Structural and non-structural timber, including internal walls, floors, and roof structures. • External and internal cladding. • Flooring, wall, and ceiling finishes. • Internal and external joinery, windows, doors, and other specialist uses of timber, such as installed furnishings or balustrades; and
Permanent Formwork, Pipes, Flooring, Blinds and Cables	The project would aim to use 90% (by cost) of all permanent formwork, pipes, flooring, blinds, and cables that meet the Green Star Best Practice Guidelines for PVC.
Other building products	The project would aim to have min 2% (by cost) of building materials to be either one of the following: • Reused Products. • Recycled Content Products. • Environmental Product Declarations. • Third-Party Certification; or • E. Stewardship Programs.

12. BUILDING MANAGEMENT

12.1. OBJECTIVES

- To achieve best practice in building management by integrating sustainability from concept design through to construction.
- To give future occupants the information they need to be able to run their buildings in the most efficient way.

Issues	Design Responses

Building tuning	The appointed building manager would aim to undertake quarterly building tuning of all services systems which would include system adjustments and measurements for the first 12 consecutive months after practical completion and a review of manufacturer and supplier warranties.
	
	The building tuning process would require the analysis of data from the monitoring systems and assessment of feedback from occupants on building conditions. During the tuning period, the building management must commit to take steps to adjust nominated building systems to account for all identified deficiencies.
	
	The commitment from the building manager must confirm that there is a requirement for a building tuning process and responsibilities are assigned to have all nominated building systems tuned after practical completion. This commitment can be included in the building tuning plan or provided as a separate document from the building Manager.
	
	The commitment must include at least the following:
	
	• Operating and Maintenance Manuals have been developed in accordance with National standards and guidelines.
	• A building tuning plan has been developed in accordance with the approved National standards and guidelines.
	• A building tuning team has been created including the facilities manager, the services contractor's representative, and the ICA (if applicable). The head contractor and the services design professionals are to be available to address specific tuning issues where required; and
	• The Building Manager would engage parties to tune the nominated systems. This engagement includes requirements for:
	  ○ Verification that nominated systems are performing to their design potential at full and part load conditions.
	  ○ Reviews of environmental performance against the environmental targets
	  ○ Collection of user feedback to match the system performance with the occupant's needs.
	  ○ Adjustment of all the systems to account for all deficiencies discovered.
	  ○ Management, communication, and assignment of responsibilities for the tuning process within the Team.

Building Users' Guide	The project would aim to develop a Building Users Guide and delivered to the building manager at practical completion of the project. The Building Users Guide would aim to meet the following requirements as outlined: • Description of initiatives designed to enhance energy efficiency and minimise greenhouse gas emissions, and measures that must be taken by users during day-to-day operation to maximise their effectiveness.

Issues	Design Responses
	• Description of initiatives intended to enhance and minimise water use and the measures that must be taken by users during day-to-day operation to maximise their effectiveness. • Description of basic function and operation of any nominated building systems that building users may come in direct contact with including any occupant-activated controls. • List of relevant contacts for maintenance information, operational issues, complaints, or other feedback (e.g., relevant facilities management team contact details and/or online request feedback form). • Description of alternative transport initiatives promoted within premises (such as bicycle facilities, end-of-trip facilities, carpooling or car-share), location of a transport plan (if available). • Local public transport information, maps, and timetables. • Description of the operational waste requirements for the building users, including what waste streams can or cannot be collected for recycling at the premises. • Information on how to maximise the efficiency potential offered by base building services and nominated building systems.
Environmental credentials of project team	The Main Contractor appointed for the project shall have a valid ISO14001 environmental management accreditation.
Environmental Management Plan – Construction and Operation	The Main Contractor is to provide a “Best Practice” Environmental Management Plan (EMP) adapted from Section 3 of the NSW Environmental Management System Guidelines (2013). The EMP shall include description item as follows: • Commitment and policy. • Construction Planning for the project. • Implementation of the plans. • Contact information of the project team involved. • Monitoring, measurement, evaluation, and review process prior to building handover.

APPENDIX A: Net Zero Statement

This Net Zero Statement has been prepared in support of a State Significant Development Application (SSDA) for the proposed project (SSD-6347570).

This Net Zero Statement address the relevant requirements under the NSW Sustainable Buildings State Environmental Planning Policies (SB SEPP), SEARs and Environmental Planning and Assessment Regulation (EP&A).

Ref. No.	SEARs Requirement	Section of Statement where response is provided
SEAR 9	If Chapter 3 of SEPP (Sustainable Buildings) 2022 applies:	
	provide a net zero statement (as defined in section 35C of the EP&A Regulation) that includes:	
	evidence of how the development will either be fossil fuel-free after the occupation of the development commences or transition to be fossil fuel-free by 1 January 2035.	this Net Zero Statement addresses this item.
	details of any renewable energy generation and storage infrastructure implemented and any passive and technical design features that minimise energy consumption.	this Net Zero Statement addresses this item.
	estimations of annual energy consumption for the building (if available)	It has been demonstrated that the project will achieve the minimum BASIX Energy requirement.

The following initiatives have included in the design; however, it remains the responsibility of the appointed design and construct contractor to ensure these initiatives are designed in detail and implemented during the construction phase.

While the development services have been designed to be fossil fuel- free by way of being all-electric systems, it remains the responsibility of the developer/ unit owners to procure 100% renewable electricity in enabling a net zero emissions operation.

On-site Fossil Fuel Usage

The mechanical and electrical services strategy for the proposed development has been designed to be all-electric from day 1 of its operation.

The electrical services design incorporates electric power outlets to serve the following equipment (provided by others) - domestic hot water heaters and kitchen equipment. This allows the project to be capable of operating at net zero emissions if the project is to procure 100% renewable electricity in addition to the onsite 120KW PV system.

Passive Design Features

The following passive design features have been integrated in order to minimise energy consumption.

- The buildings' orientation is considerate of the site's constraints, solar pathway, and overall functionality requirements.
- The shading strategy has been developed in respect to the buildings' orientation and to minimise energy consumption and glare risk, while maximising daylight ingress and as a result reducing the use of artificial lighting, use of cooling, and these systems' energy consumption.

- The façade has been designed in considerations of:
- Abundant daylight to all spaces to improve visual comfort and in minimising the use of artificial lighting. Detailed daylight simulations have been undertaken as part of the Environmental Sustainability Design (ESD) scope of works, to document daylight compliance with regulations and Green Star certification.
- Efficient natural ventilation for all teaching spaces to improve thermal comfort, indoor air quality, and to reduce the use of mechanical ventilation and cooling systems, thereby reducing energy consumption.
- The natural ventilation to dwellings is provided through the use effective openable windows, and doors.
- Compliance with the Section J requirements of the National Construction Code (NCC) 2022.

Technical Design Features

The following technical design features have been integrated into the design in order to minimise energy consumption.

- The air-conditioning system is a variable refrigerant type of system which is considered the most suitable solution for the development, and which delivers good efficiencies, particularly at lower thermal loads.
- All the air-conditioning systems utilise push-buttons with a run-on timer for activation and de-activation of the air-conditioning in all spaces. This ensures that the air-conditioning is only activated when desired by the users.
- The lighting fixtures are highly efficient LED (Light Emitting Diode) technology.
- An Energy Monitoring System (EMS) will be applied to monitor the energy usage across the project. The energy and water usage data are available to staff and can be used to inform the residents thereby assisting in their understanding of their consumption patterns, leading to an improved, more resource conscious user behaviour.

Renewable Energy Generation and Storage

The following initiatives have been implemented for the project's energy generation and storage capabilities.

- A 120kW rated rooftop photovoltaic (PV) system has been designed to provide a portion of the project's electricity usage. The PV system is located on the roof of Building 1 to 4.

Estimated Energy Consumption& GHG Emissions

Estimated energy consumption is not yet available for the project. However, it has been predicted that the development will meet the minimum BASIX Energy requirement.

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BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 1741999M_05

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.basix.nsw.gov.au

Secretary
Date of issue: Wednesday, 24 July 2024
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.

NSW GOVERNMENT

Project summary	
Project name	12-14 MINGARA DRIVE -Tumbi Umbi Retirement Village (Copy 02)_05
Street address	12 MINGARA DRIVE TUMBI UMBI 2261
Local Government Area	CENTRAL COAST
Plan type and plan number	Deposited Plan 1010532
Lot No.	1
Section no.	-
No. of residential flat buildings	4
Residential flat buildings: no. of dwellings	167
Multi-dwelling housing: no. of dwellings	52
No. of single dwelling houses	0

Project score			
Water	✔	40	Target 40
Thermal Performance	✔	Pass	Target Pass
Energy	✔	69	Target 63
Materials	✔	-100	Target n/a

Certificate Prepared by
Name / Company Name: RENYI PTY LTD
ABN (if applicable): 81603204299

Description of project

Project address	
Project name	12-14 MINGARA DRIVE -Tumbi Umbi Retirement Village (Copy 02)_05
Street address	12 MINGARA DRIVE TUMBI UMBI 2261
Local Government Area	CENTRAL COAST
Plan type and plan number	Deposited Plan 1010532
Lot No.	1
Section no.	-

Project type	
No. of residential flat buildings	4
Residential flat buildings: no. of dwellings	167
Multi-dwelling housing: no. of dwellings	52
No. of single dwelling houses	0

Site details	
Site area (m²)	29957
Roof area (m²)	9426
Non-residential floor area (m²)	3690
Residential car spaces	296
Non-residential car spaces	8

Common area landscape	
Common area lawn (m²)	3790
Common area garden (m²)	3790
Area of indigenous or low water use species (m²)	758

Assessor details and thermal loads	
Assessor number	DMN/18/1837
Certificate number	0009338920
Climate zone	15

Project score			
Water	✔	40	Target 40
Thermal Performance	✔	Pass	Target Pass
Energy	✔	69	Target 63
Materials	✔	-100	Target n/a

Description of project

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

Residential flat buildings - Building 1, 36 dwellings, 5 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)
B1101	2	101	0	0	0
B1105	2	102	0	0	0
B1201	2	101	0	0	0
B1205	2	102	0	0	0
B1301	2	101	0	0	0
B1305	2	102	0	0	0
B1401	2	101	0	0	0
B1405	2	102	0	0	0
B1501	3	139	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)
B1102	2	108	0	0	0
B1106	2	115	0	0	0
B1202	2	108	0	0	0
B1206	2	115	0	0	0
B1302	2	108	0	0	0
B1306	2	115	0	0	0
B1402	2	108	0	0	0
B1406	2	115	0	0	0
B1502	3	135	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)
B1103	3	125	0	0	0
B1107	2	117	0	0	0
B1203	3	125	0	0	0
B1207	2	117	0	0	0
B1303	3	125	0	0	0
B1307	2	117	0	0	0
B1403	3	125	0	0	0
B1407	2	117	0	0	0
B1503	3	129	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)
B1104	2	102	0	0	0
B1108	2	99	0	0	0
B1204	2	102	0	0	0
B1208	2	99	0	0	0
B1304	2	102	0	0	0
B1308	2	99	0	0	0
B1404	2	102	0	0	0
B1408	2	99	0	0	0
B1504	3	131	0	0	0

Residential flat buildings - Building 2, 15 dwellings, 3 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)
B2401	2	91	0	0	0
B2405	2	106	0	0	0
B2503	2	106	0	0	0
B2601	3	163	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)
B2402	2	104	0	0	0
B2406	2	91	0	0	0
B2504	2	95	0	0	0
B2602	3	155	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)
B2403	2	106	0	0	0
B2501	2	99	0	0	0
B2505	2	106	0	0	0
B2603	3	150	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)
B2404	2	95	0	0	0
B2502	2	104	0	0	0
B2506	2	91	0	0	0

Residential flat buildings - Building 3, 44 dwellings, 6 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)	Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
B3101	2	101	0	0	0	B3102	2	108	0	0	0	B3103	3	125	0	0	0	B3104	2	102	0	0	0
B3105	2	102	0	0	0	B3106	2	115	0	0	0	B3107	2	117	0	0	0	B3108	2	99	0	0	0
B3201	2	101	0	0	0	B3202	2	108	0	0	0	B3203	3	125	0	0	0	B3204	2	102	0	0	0
B3205	2	102	0	0	0	B3206	2	115	0	0	0	B3207	2	117	0	0	0	B3208	2	99	0	0	0
B3301	2	101	0	0	0	B3302	2	108	0	0	0	B3303	3	125	0	0	0	B3304	2	102	0	0	0
B3305	2	102	0	0	0	B3306	2	115	0	0	0	B3307	2	117	0	0	0	B3308	2	99	0	0	0
B3401	2	101	0	0	0	B3402	2	108	0	0	0	B3403	3	125	0	0	0	B3404	2	102	0	0	0
B3405	2	102	0	0	0	B3406	2	115	0	0	0	B3407	2	117	0	0	0	B3408	2	99	0	0	0
B3501	2	101	0	0	0	B3502	2	108	0	0	0	B3503	3	125	0	0	0	B3504	2	102	0	0	0
B3505	2	102	0	0	0	B3506	2	115	0	0	0	B3507	2	117	0	0	0	B3508	2	99	0	0	0
B3601	3	139	0	0	0	B3602	3	135	0	0	0	B3603	3	129	0	0	0	B3604	3	130	0	0	0

Residential flat buildings - Building 4, 72 dwellings, 5 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)	Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
B4101	2	97	0	0	0	B4102	3	119	0	0	0	B4103	3	125	0	0	0	B4104	2	105	0	0	0
B4105	2	105	0	0	0	B4106	2	105	0	0	0	B4107	2	114	0	0	0	B4108	2	99	0	0	0
B4109	2	112	0	0	0	B4110	2	105	0	0	0	B4111	2	108	0	0	0	B4112	2	105	0	0	0
B4113	2	105	0	0	0	B4114	2	115	0	0	0	B4115	2	112	0	0	0	B4116	2	99	0	0	0
B4201	2	97	0	0	0	B4202	3	119	0	0	0	B4203	3	125	0	0	0	B4204	2	105	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)
B4205	2	105	0	0	0
B4209	2	112	0	0	0
B4213	2	105	0	0	0
B4301	2	97	0	0	0
B4305	2	105	0	0	0
B4309	2	112	0	0	0
B4313	2	105	0	0	0
B4401	2	97	0	0	0
B4405	2	105	0	0	0
B4409	2	112	0	0	0
B4413	2	105	0	0	0
B4501	3	139	0	0	0
B4505	3	134	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)
B4206	2	105	0	0	0
B4210	2	105	0	0	0
B4214	2	115	0	0	0
B4302	3	119	0	0	0
B4306	2	105	0	0	0
B4310	2	105	0	0	0
B4314	2	115	0	0	0
B4402	3	119	0	0	0
B4406	2	105	0	0	0
B4410	2	105	0	0	0
B4414	2	115	0	0	0
B4502	3	131	0	0	0
B4506	3	139	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)
B4207	2	114	0	0	0
B4211	2	108	0	0	0
B4215	2	112	0	0	0
B4303	3	125	0	0	0
B4307	2	114	0	0	0
B4311	2	108	0	0	0
B4315	2	112	0	0	0
B4403	3	125	0	0	0
B4407	2	114	0	0	0
B4411	2	108	0	0	0
B4415	2	112	0	0	0
B4503	3	131	0	0	0
B4507	3	139	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)
B4208	2	99	0	0	0
B4212	2	105	0	0	0
B4216	2	99	0	0	0
B4304	2	105	0	0	0
B4308	2	99	0	0	0
B4312	2	105	0	0	0
B4316	2	99	0	0	0
B4404	2	105	0	0	0
B4408	2	99	0	0	0
B4412	2	105	0	0	0
B4416	2	99	0	0	0
B4504	3	141	0	0	0
B4508	3	143	0	0	0

Multi-dwelling houses

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
01001	3	132	0	0	0
02001	3	128	0	0	0
03001	3	128	0	0	0
04001	3	133	0	0	0
05001	3	135	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)
01002	3	133	0	0	0
02002	3	133	0	0	0
03002	3	133	0	0	0
04002	3	135	0	0	0
05002	3	133	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)
01101	3	137	5	0	0
02101	3	136	7	0	0
03101	3	136	7	0	0
04101	3	133	9	0	0
05101	3	136	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)
01102	3	136	0	0	0
02102	3	136	0	0	0
03102	3	136	0	0	0
04102	3	136	0	0	0
05102	3	133	9	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)
06001	3	128	0	0	0
07001	3	133	0	0	0
08001	3	133	0	0	0
09001	3	133	0	0	0
10001	3	128	0	0	0
11001	3	133	0	0	0
12001	3	128	0	0	0
13001	3	133	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)
06002	3	133	0	0	0
07002	3	128	0	0	0
08002	3	135	0	0	0
09002	3	128	0	0	0
10002	3	133	0	0	0
11002	3	128	0	0	0
12002	3	133	0	0	0
13002	3	128	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)
06101	3	136	7	0	0
07101	3	136	0	0	0
08101	3	133	9	0	0
09101	3	136	0	0	0
10101	3	136	7	0	0
11101	3	136	0	0	0
12101	3	136	7	0	0
13101	3	136	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)
06102	3	136	0	0	0
07102	3	136	7	0	0
08102	3	136	0	0	0
09102	3	136	7	0	0
10102	3	136	0	0	0
11102	3	136	7	0	0
12102	3	136	0	0	0
13102	3	136	7	0	0

Description of project

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

Common areas of unit building - Building 1

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Undercover car park area (No. 1)	1150	Switch room (No. 1)	15.8	Garbage room (No. 1)	53.7
Plant or service room (No. 1)	14	Ground floor lobby type (No. 1)	23.5	Hallway/lobby type (No. 1)	308

Common areas of unit building - Building 2

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Undercover car park area (No. 2)	685	Switch room (No. 2)	20.5	Garbage room (No. 2)	57.3
Community room (No. 1)	110	Plant or service room (No. 2)	28	Ground floor lobby type (No. 2)	12.1
Hallway/lobby type (No. 2)	302				

Common areas of unit building - Building 3

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Undercover car park area (No. 3)	1352	Switch room (No. 3)	63	Garbage room (No. 3)	63.7
Plant or service room (No. 3)	9.5	Ground floor lobby type (No. 3)	21.1	Hallway/lobby type (No. 3)	433

Common areas of unit building - Building 4

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Undercover car park area (No. 4)	2233	Switch room (No. 4)	32.4	Garbage room (No. 4)	53.4
Garbage room (No. 5)	54.7	Plant or service room (No. 4)	20.3	Ground floor lobby type (No. 4)	75
Hallway/lobby type (No. 4)	726				

Common areas of the development (non-building specific)

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Undercover car park area (No. 5)	1202	Lift bank (No. 1)	-	Lift bank (No. 2)	-
Lift bank (No. 3)	-	Lift bank (No. 4)	-	Lift bank (No. 5)	-

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - Building 1

- (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 2

- (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 Residential flat buildings - Building 3

- (a) Buildings
  - (i) Materials
- (b) Dwellings
  - (i) Water

(ii) Energy
(iii) Thermal Performance

(c) Common areas and central systems/facilities
(i) Water
(ii) Energy

4. Commitments for Residential flat buildings - Building 4

(a) Buildings
(i) Materials

(b) Dwellings
(i) Water
(ii) Energy
(iii) Thermal Performance

(c) Common areas and central systems/facilities
(i) Water
(ii) Energy

5. Commitments for multi-dwelling housing

(a) Dwellings
(i) Water
(ii) Energy
(iii) Thermal Performance and Materials

6. 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 1

(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 open subfloor, frame: suspended concrete slab	880	foil-foam composite board	none
floors above habitable rooms, frame: suspended concrete slab	3170	-	none

External wall types				
External wall type	**Construction type**	**Area (m2)**	**Low emissions option**	**Insulation**
External wall type 1	brick veneer,frame:light steel frame	827	none	rockwool batts, roll or pump-in
External wall type 2	framed (fibre cement sheet or boards),frame:light steel frame	341	none	rockwool batts, roll or pump-in

Internal wall types			
Internal wall type	**Construction type**	**Area (m2)**	**Insulation**
Internal wall type 1	plasterboard, frame:light steel frame	3016	-
Internal wall type 2	75 mm AAC panel, frame:light steel frame	2139	rockwool batts, roll or pump-in

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	**Volume (m^3)**	**Low emissions option**
yes	89	-

Ceiling and roof types			
Ceiling and roof type	**Area (m^2)**	**Roof Insulation**	**Ceiling Insulation**
concrete - plasterboard internal, frame: light steel frame	781	-	foil-foam composite board

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)**
198	234	0	432	0	0	0	0

(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 (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	-	-	-	-	-	-	-	-	-	-

	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	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
All dwellings	Central cooling system (No. 1)	Central cooling system (No. 1)	Central heating system (No. 1)	Central heating system (No. 1)	0	no

	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	-	-	-	-	-	induction cooktop & electric oven	4 star	3.5 star	no	no

(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)
B1101	45.10	15.40	60.500
B1102	18.90	17.30	36.200
B1103	6.50	17.40	23.900
B1104	13.60	16.30	29.900

	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)
B1105	14.10	16.40	30.500
B1106	19.40	15.30	34.700
B1107	42.00	9.90	51.900
B1108	27.50	18.70	46.200
B1201	30.10	18.00	48.100
B1202	14.70	23.60	38.300
B1203	2.30	21.60	23.900
B1204	6.00	21.00	27.000
B1205	6.30	21.10	27.400
B1206	11.80	18.30	30.100
B1207	32.90	13.20	46.100
B1208	18.10	20.40	38.500
B1301	35.00	15.10	50.100
B1302	19.00	18.60	37.600
B1303	4.40	16.70	21.100
B1304	8.80	18.30	27.100
B1305	9.100	18.20	27.300
B1306	15.60	16.10	31.700
B1307	37.60	11.50	49.100
B1308	22.00	17.80	39.800
B1401	37.50	15.80	53.300
B1402	34.600	21.30	55.900
B1403	16.10	19.80	35.900
B1404	11.80	19.40	31.200
B1405	12.20	19.30	31.500
B1406	26.00	18.30	44.300
B1407	47.50	13.80	61.300
B1408	24.40	18.50	42.900
B1501	25.70	16.10	41.800
B1502	17.50	16.90	34.400
B1503	25.10	15.30	40.400

	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)
All other dwellings	42.80	20.20	63.000

(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	4 star

Central systems	Size	Configuration	Connection (to allow for...)
Fire sprinkler system (No. 1)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-
Central cooling system (No. 1)	-	Private water meter on make-up line connected to building management system. Conductivity controller installed in the cooling tower.	-

(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.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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
Undercover car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	no
Switch room (No. 1)	ventilation supply only	thermostatically controlled	light-emitting diode	motion sensors	no
Garbage room (No. 1)	ventilation exhaust only	-	light-emitting diode	motion sensors	no
Plant or service room (No. 1)	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	no
Ground floor lobby type (No. 1)	ventilation supply only	time clock or BMS controlled	light-emitting diode	motion sensors	no
Hallway/lobby type (No. 1)	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	no

Central energy systems	Type	Specification
Lift bank (No. 1)	gearless traction with V V V F motor	Number of levels (including basement): 5 number of levels from the bottom of the lift shaft to the top of the lift shaft: 6 number of lifts: 2 lift load capacity: >= 1001 kg but <= 1500kg
Central hot water system (No. 1)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: no external pipework; (b) Piping internal to building: R1.0 (~38 mm) (c) Unit Efficiency: 2.5 < COP <= 3.0
Central cooling system (No. 1)	variable refrigerant volume units	Energy source: electric driven compressor Heat rejection method: water cooled condenser Unit efficiency (min): low – COP < 3.5
Central heating system (No. 1)	variable refrigerant volume units	Energy source: electric driven compressor + air sourced evaporator Unit efficiency medium – COP 3.5 – 5.5

2. Commitments for Residential flat buildings - Building 2

(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 open subfloor, frame: suspended concrete slab	15	foil-foam composite board	none
floors above habitable rooms, frame: suspended concrete slab	1670	-	none

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	brick veneer,frame:light steel frame	349	none	rockwool batts, roll or pump-in
External wall type 2	framed (fibre cement sheet or boards),frame:light steel frame	163	none	rockwool batts, roll or pump-in

Internal wall types

Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	plasterboard, frame:light steel frame	1256	-
Internal wall type 2	75 mm AAC panel, frame:light steel frame	891	rockwool batts, roll or pump-in

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	Volume (m^3)	Low emissions option
yes	38	-

Ceiling and roof types			
Ceiling and roof type	Area (m^2)	Roof Insulation	Ceiling Insulation
concrete - plasterboard internal, frame: light steel frame	684	-	foil-foam composite board

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)
91	106	0	197	0	0	0	0

(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 (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	-	-	-	-	-	-	-	-	-	-

	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	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
All dwellings	Central cooling system (No. 2)	Central cooling system (No. 2)	Central heating system (No. 2)	Central heating system (No. 2)	0	no

	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	-	-	-	-	-	induction cooktop & electric oven	4 star	3.5 star	no	no

(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)
B2401	19.70	16.90	36.600
B2402	29.90	20.30	50.200
B2403	20.80	18.60	39.400
B2404	11.10	19.80	30.900

	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)
B2405	7.50	20.80	28.300
B2406	9.40	15.90	25.300
B2501	21.00	17.20	38.200
B2502	36.00	22.40	58.400
B2503	31.10	20.80	51.900
B2504	15.20	21.50	36.700
B2505	14.90	23.10	38.000
B2506	16.60	19.10	35.700
B2601	33.70	17.60	51.300
B2602	34.00	18.90	52.900
All other dwellings	17.30	20.50	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	4 star

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	30000	To collect run-off from at least: - 1939 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 3790 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Fire sprinkler system (No. 2)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-
Central cooling system (No. 2)	-	Private water meter on make-up line connected to building management system. Conductivity controller installed in the cooling tower.	-

(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
Undercover car park area (No. 2)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	no
Switch room (No. 2)	ventilation supply only	thermostatically controlled	light-emitting diode	motion sensors	no
Garbage room (No. 2)	ventilation exhaust only	-	light-emitting diode	motion sensors	no
Community room (No. 1)	air conditioning system	time clock or BMS controlled	light-emitting diode	motion sensors	no
Plant or service room (No. 2)	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	no
Ground floor lobby type (No. 2)	ventilation supply only	time clock or BMS controlled	light-emitting diode	motion sensors	no
Hallway/lobby type (No. 2)	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	no

Central energy systems	Type	Specification
Lift bank (No. 2)	gearless traction with V V V F motor	Number of levels (including basement): 3 number of levels from the bottom of the lift shaft to the top of the lift shaft: 7 number of lifts: 2 lift load capacity: >= 1001 kg but <= 1500kg
Central hot water system (No. 2)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: no external pipework; (b) Piping internal to building: R1.0 (~38 mm) (c) Unit Efficiency: 2.5 < COP <= 3.0
Central cooling system (No. 2)	variable refrigerant volume units	Energy source: electric driven compressor Heat rejection method: water cooled condenser Unit efficiency (min): low – COP < 3.5

Central energy systems	Type	Specification
Central heating system (No. 2)	variable refrigerant volume units	Energy source: electric driven compressor + air sourced evaporator Unit efficiency medium – COP 3.5 – 5.5

3. Commitments for Residential flat buildings - Building 3

(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 open subfloor, frame: suspended concrete slab	880	foil-foam composite board	none
floors above habitable rooms, frame: suspended concrete slab	4050	-	none

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	brick veneer,frame:light steel frame	1014	none	rockwool batts, roll or pump-in
External wall type 2	framed (fibre cement sheet or boards),frame:light steel frame	418	none	rockwool batts, roll or pump-in

Internal wall types

Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	plasterboard, frame:light steel frame	3683	-
Internal wall type 2	75 mm AAC panel, frame:light steel frame	2614	rockwool batts, roll or pump-in

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	Volume (m^3)	Low emissions option
yes	112	-

Ceiling and roof types			
Ceiling and roof type	Area (m^2)	Roof Insulation	Ceiling Insulation
concrete - plasterboard internal, frame: light steel frame	781	-	foil-foam composite board

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)
242	286	0	528	0	0	0	0

(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 (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	-	-	-	-	-	-	-	-	-	-

	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. 3)	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
All dwellings	Central cooling system (No. 3)	Central cooling system (No. 3)	Central heating system (No. 3)	Central heating system (No. 3)	0	no

	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	-	-	-	-	-	induction cooktop & electric oven	4 star	3.5 star	no	no

(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)
B3101	51.30	8.70	60.000
B3102	28.900	16.00	44.900
B3103	10.10	15.30	25.400
B3104	27.10	8.90	36.000

	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)
B3105	25.100	8.90	34.000
B3106	12.00	18.80	30.800
B3107	33.10	14.40	47.500
B3108	32.10	9.90	42.000
B3201	36.20	10.20	46.400
B3202	21.90	20.70	42.600
B3203	5.80	20.30	26.100
B3204	15.10	10.40	25.500
B3205	8.70	10.60	19.300
B3206	5.70	21.60	27.300
B3207	25.70	15.40	41.100
B3208	22.00	11.60	33.600
B3301	41.20	9.10	50.300
B3302	26.30	17.10	43.400
B3303	7.60	15.70	23.300
B3304	13.20	9.20	22.400
B3305	7.10	9.20	16.300
B3306	4.70	17.70	22.400
B3307	30.40	13.30	43.700
B3308	26.00	10.40	36.400
B3401	42.20	9.10	51.300
B3402	27.30	17.00	44.300
B3403	5.50	15.40	20.900
B3404	7.00	9.90	16.900
B3405	6.90	9.50	16.400
B3406	4.900	17.70	22.600
B3407	31.40	12.70	44.100
B3408	26.80	10.30	37.100
B3501	44.50	9.20	53.700
B3502	42.90	19.40	62.300
B3503	16.20	18.50	34.700

	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)**
B3504	9.40	10.00	19.400
B3505	9.20	10.10	19.300
B3506	12.200	20.00	32.200
B3507	40.60	14.10	54.700
B3508	29.10	10.60	39.700
B3601	34.20	19.40	53.600
B3602	18.00	16.40	34.400
B3603	14.00	13.40	27.400
All other dwellings	42.800	14.00	56.800

(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	4 star

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 2)	30000	To collect run-off from at least: - 1939 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 3790 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Fire sprinkler system (No. 3)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-
Central cooling system (No. 3)	-	Private water meter on make-up line connected to building management system. Conductivity controller installed in the cooling tower.	-

(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
Undercover car park area (No. 3)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	no
Switch room (No. 3)	ventilation supply only	thermostatically controlled	light-emitting diode	motion sensors	no
Garbage room (No. 3)	ventilation exhaust only	-	light-emitting diode	motion sensors	no
Plant or service room (No. 3)	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	no
Ground floor lobby type (No. 3)	ventilation supply only	time clock or BMS controlled	light-emitting diode	motion sensors	no
Hallway/lobby type (No. 3)	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	no

Central energy systems	Type	Specification
Lift bank (No. 3)	gearless traction with V V V F motor	Number of levels (including basement): 6 number of levels from the bottom of the lift shaft to the top of the lift shaft: 7 number of lifts: 2 lift load capacity: >= 1001 kg but <= 1500kg
Central hot water system (No. 3)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: no external pipework; (b) Piping internal to building: R1.0 (~38 mm) (c) Unit Efficiency: 2.5 < COP <= 3.0
Central cooling system (No. 3)	variable refrigerant volume units	Energy source: electric driven compressor Heat rejection method: water cooled condenser Unit efficiency (min): low – COP < 3.5

Central energy systems	Type	Specification
Central heating system (No. 3)	variable refrigerant volume units	Energy source: electric driven compressor + air sourced evaporator Unit efficiency medium – COP 3.5 – 5.5

4. Commitments for Residential flat buildings - Building 4

(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 open subfloor, frame: suspended concrete slab	1750	foil-foam composite board	none
floors above habitable rooms, frame: suspended concrete slab	6340	-	none

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	brick veneer,frame:light steel frame	1653	none	rockwool batts, roll or pump-in
External wall type 2	framed (fibre cement sheet or boards),frame:light steel frame	681	none	rockwool batts, roll or pump-in

Internal wall types

Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	plasterboard, frame:light steel frame	6027	-
Internal wall type 2	75 mm AAC panel, frame:light steel frame	4279	rockwool batts, roll or pump-in

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	Volume (m^3)	Low emissions option
yes	183	-

Ceiling and roof types			
Ceiling and roof type	Area (m^2)	Roof Insulation	Ceiling Insulation
concrete - plasterboard internal, frame: light steel frame	1632	-	foil-foam composite board

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)
361	432	0	793	0	0	0	0

(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 (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	-	-	-	-	-	-	-	-	-	-

	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. 4)	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
All dwellings	Central cooling system (No. 4)	Central cooling system (No. 4)	Central heating system (No. 4)	Central heating system (No. 4)	0	no

	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	-	-	-	-	-	induction cooktop & electric oven	4 star	3.5 star	no	no

(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)
B4101	31.70	10.20	41.900
B4102	24.30	21.30	45.600
B4103	19.10	22.90	42.000
B4104	28.30	7.70	36.000

	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)
B4105	35.00	7.20	42.200
B4106	29.30	7.20	36.500
B4107	27.70	7.80	35.500
B4108	33.30	9.60	42.900
B4109	32.90	7.80	40.700
B4110	10.10	9.10	19.200
B4111	9.50	24.10	33.600
B4112	25.70	15.30	41.000
B4113	25.90	15.50	41.400
B4114	27.70	15.80	43.500
B4115	35.20	17.60	52.800
B4116	32.50	15.10	47.600
B4201	21.40	10.90	32.300
B4202	15.50	22.50	38.000
B4203	13.60	30.10	43.700
B4204	12.10	9.50	21.600
B4205	17.60	9.20	26.800
B4206	13.30	9.00	22.300
B4207	14.30	9.50	23.800
B4208	22.70	11.40	34.100
B4209	19.40	8.40	27.800
B4210	2.60	10.70	13.300
B4211	5.500	28.30	33.800
B4212	15.000	20.70	35.700
B4213	15.50	21.00	36.500
B4214	17.80	23.40	41.200
B4215	21.80	21.90	43.700
B4216	18.10	24.80	42.900
B4301	25.40	9.70	35.100
B4302	19.50	18.90	38.400
B4303	15.50	24.70	40.200

	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)
B4304	11.900	8.60	20.500
B4305	13.20	8.00	21.200
B4306	8.60	8.10	16.700
B4307	16.20	7.30	23.500
B4308	26.70	10.10	36.800
B4309	22.50	7.00	29.500
B4310	4.00	9.50	13.500
B4311	6.70	23.30	30.000
B4312	18.40	17.90	36.300
B4313	18.90	18.70	37.600
B4314	21.80	20.10	41.900
B4315	20.6	17.70	38.300
B4316	19.90	22.00	41.900
B4401	29.70	10.00	39.700
B4402	32.00	23.70	55.700
B4403	29.20	28.50	57.700
B4404	12.70	9.30	22.000
B4405	13.50	9.30	22.800
B4406	8.90	9.20	18.100
B4407	26.80	8.40	35.200
B4408	30.70	10.50	41.200
B4409	36.50	9.00	45.500
B4410	6.60	10.10	16.700
B4411	15.00	27.30	42.300
B4412	22.70	19.100	41.800
B4413	23.20	19.50	42.700
B4414	31.80	22.80	54.600
B4415	31.40	21.50	52.900
B4416	21.20	24.40	45.600
B4501	38.20	27.80	66.000
B4502	10.40	12.90	23.300

	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)
B4503	8.90	11.10	20.000
B4504	41.10	15.00	56.100
B4505	15.30	13.60	28.900
B4506	22.00	19.10	41.100
B4507	39.90	18.80	58.700
All other dwellings	38.20	27.60	65.800

(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	4 star

Central systems	Size	Configuration	Connection (to allow for...)
Fire sprinkler system (No. 4)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-
Central cooling system (No. 4)	-	Private water meter on make-up line connected to building management system. Conductivity controller installed in the cooling tower.	-

(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.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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
Undercover car park area (No. 4)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	no
Switch room (No. 4)	ventilation supply only	thermostatically controlled	light-emitting diode	motion sensors	no
Garbage room (No. 4)	ventilation exhaust only	-	light-emitting diode	motion sensors	no
Garbage room (No. 5)	ventilation exhaust only	-	light-emitting diode	motion sensors	no
Plant or service room (No. 4)	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	no
Ground floor lobby type (No. 4)	ventilation supply only	time clock or BMS controlled	light-emitting diode	motion sensors	no
Hallway/lobby type (No. 4)	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	no

Central energy systems	Type	Specification
Lift bank (No. 4)	gearless traction with V V V F motor	Number of levels (including basement): 5 number of levels from the bottom of the lift shaft to the top of the lift shaft: 6 number of lifts: 4 lift load capacity: >= 1001 kg but <= 1500kg
Central hot water system (No. 4)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: no external pipework; (b) Piping internal to building: R1.0 (~38 mm) (c) Unit Efficiency: 2.5 < COP <= 3.0
Central cooling system (No. 4)	variable refrigerant volume units	Energy source: electric driven compressor Heat rejection method: water cooled condenser Unit efficiency (min): low – COP < 3.5
Central heating system (No. 4)	variable refrigerant volume units	Energy source: electric driven compressor + air sourced evaporator Unit efficiency medium – COP 3.5 – 5.5

5. Commitments for multi-dwelling housing

(a) 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 (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	-	-	-	-	-	-	-	-	-	-

	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:			

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	
(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".		✔	
(j) The applicant must install the photovoltaic system specified for the dwelling under the “Photovoltaic system” heading of the “Alternative energy” column of the table below, and connect the system to that dwelling’s electrical system.	✔	✔	✔

	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	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
All dwellings	Central cooling system (No. 1)	Central cooling system (No. 1)	Central heating system (No. 1)	Central heating system (No. 1)	0	no

	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	-	-	-	-	-	induction cooktop & electric oven	4 star	3.5 star	no	no

	Alternative energy		
Dwelling no.	**Photovoltaic system (min rated electrical output in peak kW)**	**Photovoltaic collector installation**	**Orientation inputs**
All dwellings	-	-	-

(iii) Thermal Performance and Materials	**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)
01001	20.40	7.90	28.300
01002	15.400	9.10	24.500
01101	30.60	16.70	47.300
01102	22.20	17.20	39.400
02001	41.80	6.00	47.800
02002	14.50	8.90	23.400
02101	27.9	20.7	48.600
02102	24.90	19.80	44.700
03001	41.60	5.90	47.500
03002	21.10	8.60	29.700
03101	30.9	19.6	50.500
03102	25.50	19.80	45.300
04001	29.80	17.60	47.400
04002	18.80	7.00	25.800
04101	25.7	20.8	46.500
04102	27.20	20.00	47.200
05001	28.80	6.60	35.400
05002	13.50	17.00	30.500
05101	32.9	16.6	49.500
05102	17.7	21.2	38.900
06001	44.40	5.00	49.400
06002	19.80	9.00	28.800
06101	31.2	19.7	50.900
06102	24.70	20.80	45.500
07001	24.70	6.40	31.100
07002	32.70	6.90	39.600
07101	31.7	18.7	50.400
07102	22.80	19.50	42.300
08001	25.10	20.10	45.200
08002	13.30	6.80	20.100
08101	25.8	20.6	46.400

	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)
08102	24.90	14.70	39.600
09001	40.50	7.70	48.200
09002	25.50	9.80	35.300
09101	17.9	20.1	38.000
09102	23.60	23.50	47.100
10001	44.9	5.9	50.800
10002	34.70	7.90	42.600
10101	30.50	19.70	50.200
10102	29.3	21.1	50.400
11001	40.800	7.70	48.500
11002	42.10	5.90	48.000
11101	34.6	16.4	51.000
11102	22.60	23.60	46.200
12001	43.2	4.60	47.800
12002	32.80	6.80	39.600
12101	22.70	16.00	38.700
12102	30.20	19.70	49.900
13001	28.90	8.30	37.200
13002	44.50	6.10	50.600
13101	35.000	14.70	49.700
All other dwellings	21.50	19.90	41.400

	Construction of floors and walls				
Dwelling no.	Concrete slab on ground (m²)	Suspended floor with open subfloor (m²)	Suspended floor with enclosed subfloor (m²)	Suspended floor above garage (m²)	Primarily rammed earth or mudbrick walls
01001	132	-	-	-	no
04002, 05001, 08002	135	-	-	-	no
02001, 03001, 06001, 07002, 09002, 10001, 11002, 12001, 13002	128	-	-	-	no

	Construction of floors and walls				
Dwelling no.	Concrete slab on ground (m²)	Suspended floor with open subfloor (m²)	Suspended floor with enclosed subfloor (m²)	Suspended floor above garage (m²)	Primarily rammed earth or mudbrick walls
01002, 02002, 03002, 04001, 05002, 06002, 07001, 08001, 09001, 10002, 11001, 12002, 13001	133	-	-	-	no
All other dwellings	10	-	-	-	no

	Floor types									
	Concrete slab on ground				Suspended floor above enclosed subfloor			Suspended floor above open subfloor		
Dwelling no.	Area (m²)	Insulation	Low emissions option	Dematerialisation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation
01001	132	-	-	conventional slab	-	-	-	-	-	-
04002, 05001, 08002	135	-	-	conventional slab	-	-	-	-	-	-
02001, 03001, 06001, 07002, 09002, 10001, 11002, 12001, 13002	128	-	-	conventional slab	-	-	-	-	-	-
01002, 02002, 03002, 04001, 05002, 06002, 07001, 08001, 09001, 10002, 11001, 12002, 13001	133	-	-	conventional slab	-	-	-	-	-	-
All other dwellings	10	-	-	conventional slab	-	-	-	-	-	-

	Floor types										
	First floor above habitable rooms or mezzanine			Suspended floor above garage			Garage floor				
Dwelling no.	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Low emissions option	Dematerialisation
01101, 04101, 05102, 08101	concrete - suspended	132	-	-	-	-	concrete slab on ground	20	-	none	conventional slab
02101, 03101, 06101, 07102, 09102, 10101, 11102, 12101, 13102	concrete - suspended	133	-	-	-	-	concrete slab on ground	20	-	none	conventional slab
01102, 02102, 03102, 04102, 05101, 06102, 07101, 08102, 09101, 10102, 11101, 12102, 13101	concrete - suspended	126	-	-	-	-	concrete slab on ground	20	-	none	conventional slab

	Floor types										
	First floor above habitable rooms or mezzanine			Suspended floor above garage			Garage floor				
Dwelling no.	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Low emissions option	Dematerialisation
All other dwellings	concrete - suspended	50	-	-	-	-	concrete slab on ground	20	-	none	conventional slab

	External walls							
	External wall type 1				External wall type 2			
Dwelling no.	Wall type	Area (m²)	Insulation	Low emissions option	Wall type	Area (m²)	Insulation	Low emissions option
All dwellings	cavity brick, frame : light steel frame	30	rockwool batts, roll or pump-in	none	framed (fibre cement sheet or boards), frame : light steel frame	20	rockwool batts, roll or pump-in	none

	External walls							
	External wall type 3				External wall type 4			
Dwelling no.	Wall type	Area (m²)	Insulation	Low emissions option	Wall type	Area (m²)	Insulation	Low emissions option
All dwellings	-	-	-	-	-	-	-	-

	Internal walls								
	Internal walls shared with garage			Internal wall type 1			Internal wall type 2		
Dwelling no.	Wall type	Area (m²)	Insulation	Wall type	Area (m²)	Insulation	Wall type	Area (m²)	Insulation
All dwellings	-	-	-	plasterboard, frame: light steel frame	50	-	75 mm AAC panel, frame: light steel frame	30	-

	Ceiling and roof								
	Flat ceiling / pitched roof			Raked ceiling / pitched or skillion roof			Flat ceiling / flat roof		
Dwelling no.	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation
01001, 01002, 02001, 02002, 03001, 03002, 04001, 04002, 05001, 05002, 06001, 06002, 07001, 07002, 08001, 08002, 09001, 09002, 10001, 10002, 11001, 11002, 12001, 12002, 13001, 13002	-	-	Ceiling:,Roof:	-	-	Ceiling:,Roof:	concrete - plasterboard internal, frame: light steel frame	24	Ceiling:foil-foam composite board,Roof: none
All other dwellings	-	-	Ceiling:,Roof:	-	-	Ceiling:,Roof:	concrete - plasterboard internal, frame: light steel frame	189	Ceiling:foil-foam composite board,Roof: none

	Glazing type			Frame types				
Dwelling no.	Single glazing (m²)	Double glazing (m²)	Triple glazing (m²)	Aluminium frames (m²)	Timber frames (m²)	uPVC frames (m²)	Steel frames (m²)	Composite frames (m²)
All dwellings	17	18	0	35	0	0	0	0

6. 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
concrete slab on ground, frame:	10	-	none

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	brick veneer,frame:light steel frame	10	none	rockwool batts, roll or pump-in

Internal wall types

Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	plasterboard, frame:light steel frame	10	-
Internal wall type 2	75 mm AAC panel, frame:light steel frame	10	rockwool batts, roll or pump-in

Reinforcement concrete frames/columns

Building has reinforced concrete frame/columns?	Volume (m^3)	Low emissions option
no	-	-

Ceiling and roof types			
Ceiling and roof type	**Area (m²)**	**Roof Insulation**	**Ceiling Insulation**
concrete - plasterboard internal, frame: light steel frame	10	-	foil-foam composite board

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	0	0	0	0	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	4 star

(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**
Undercover car park area (No. 5)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	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
Lift bank (No. 3)	-	-	light-emitting diode	connected to lift call button	no
Lift bank (No. 4)	-	-	light-emitting diode	connected to lift call button	no
Lift bank (No. 5)	-	-	light-emitting diode	connected to lift call button	-

Central energy systems	Type	Specification
Lift bank (No. 5)	gearless traction with V V V F motor	Number of levels (including basement): 2 number of levels from the bottom of the lift shaft to the top of the lift shaft: 2 number of lifts: 13 lift load capacity: >= 1001 kg but <= 1500kg
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 120 peak kW
Other	Building management system installed?: yes Active power factor correction installed?: yes	-

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).

Thermal Comfort Item	Details
External Walls 1 – FC cladding	Fibre cement panels + R2.5 and foil added + plasterboard
External Walls 2 – Brick Veneer	Brick veneer walls + R2.5 and foil added + plasterboard
External Wall / Roof / Floor steel studs	Thermal breaks for studs next to ext. wall, floor, roof = R0.2
Walls next to lifts and stairs	Concrete >150mm + plasterboard lining
Party walls units	Hebel wall + plasterboard + optional insul. added
Party walls house	Concrete block for fire-rating (core-filled for structure)
Walls next to halls/lobbies	Hebel wall + plasterboard + R2 acoustic insul. added
Internal Wall Units 1	Plasterboard on Studs
Internal Wall Units 2	Concrete column
Floor Finishes (as shown)	Tiles - wet areas, carpet - beds, floating timber –
Internal Floors	Concrete floors, with aged care/neighbour below
External Floors	Concrete slab with outside air or basement below
External Floor Insulation	R2.5 under ext. floors (over open air or over basement)
Roofs 1 - penthouse roof	Concrete roof + R3.8 + foil + plasterboard (Primepanel or similar)
Roofs 1 - below balconies/terraces	Concrete roof + R2.4 + foil + plasterboard (Primepanel or similar)
Roof Colour	Light colour for roofs
Weather Stripping	All external doors and windows
Ceiling fans	Fans added for beds +living zones - adds 1.0 star in most
Skylights tinted	Double glazed (with whole-window values: U<2.7 and SHGC =
Exhaust fans near Insulation	Exhaust Fans wet areas (sealed but holes assumed in insul.)
Downlights near Insulation	LED downlights (sealed but generic holes assumed in insul.)
Glass 1 -non bed/bath (+ all 11 cold units)	**Double-glazing and aluminium frames**
11 colder units need 100% double-glazing:	v2.101, v3.101, v4.101, v5.101, v5.102, v6.101, v7.101, v8.101, v9.101, v10.102, v11.101
Living /Dining - Awning (+ in 11 cold units)	Double-glazing and aluminium frames
• Windows - U-value	• ≤ 3.6 awning/bifold
• Windows – SHGC	• 0.47 ±5% awning/bifold
Living /Dining fix/Slider (+ in 11 cold units)	Double-glazing and aluminium frames
• Windows - U-value	• ≤ 3.1 fixed/sliders
• Windows – SHGC	• 0.49 ±5% fixed/sliders
Glass 2 - bed/bath (except 11 cold units)	**Low-E single-glazing and aluminium frames**
Bed/Bath - Awning (except 11 cold units)	Low-E single-glazing and aluminium frames
• Windows - U-value	• ≤ 4.8 awning/bifold
• Windows – SHGC	• 0.59 ±5% awning/bifold
Bed/Bath fix/Slider (except 11 cold units)	Low-E single-glazing and aluminium frames
• Windows - U-value	• ≤ 5.4 fixed/sliders
• Windows – SHGC	• 0.49 ±5% fixed/sliders

Simulation notes

- Concrete type and width may need updating at CC stage with construction details (generic values assumed)
- Floor types and thickness may need checking at CC stage, due to complexity of the proposed construction.
- No RCP provided at DA so generic holes assumed for all downlights (may need extra checking and rerunning at CC stage)
- No RCP provided at DA so generic holes assumed for all exhaust fans (may need extra checking and rerunning at CC stage)
- Window sizes used from window schedules, elevations and sections (and this may need re-checking at CC stage if shop drawings require window changes). The modelling will check shop drawings and other CC drawings and refine glazing values, if required.
- Neighbours modelled as shown on drawings but no tree preservations in place and not modelled