Council Meeting

10.1 Planning Application - YR-021/1040 - 266-268 Maroondah Highway, Chirnside Park – Attachment 10

Tuesday, 27 September 2022

Civic Centre, 15 Anderson Street, Lilydale

Information for Councillors and the community

ACKNOWLEDGEMENT OF COUNTRY

We respectfully acknowledge the Traditional Owners, the Wurundjeri People, as the Custodians of this land. We also pay respect to all Aboriginal community Elders, past and present, who have resided in the area and have been an integral part of the history of this region.

COUNCIL VISION

Whether you live here or visit, you will see how much we care for country, how inclusive and connected our communities are, and how sustainable balanced growth makes this the best place in the world.

VALUE OF HISTORY

We acknowledge that history shapes our identities, engages us as citizens, creates inclusive communities, is part of our economic well-being, teaches us to think critically and creatively, inspires leaders and is the foundation of our future generations.

COUNCILLOR COMMITMENT

We'll be truthful, represent the community's needs, be positive and responsive and always strive to do better.

OUR COUNCILLORS

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Chandler Ward: David Eastham
Chirnside Ward: Richard Higgins
Lyster Ward: Johanna Skelton
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Agenda

Planning, Design and Development

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

CREATE A BETTER PLACE TO LIVE.

Sustainability Management Plan
Summerset
275 Manchester Road, Chirnside Park

SUSTAINABLE DEVELOPMENT _CONSULTANTS

Proposed Summerset Community – 275 Manchester Road, Chirnside Park

Sustainability Management Plan

April 2022

S4575 SMP.V5

PREPARED BY:

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Version	Date of Issue	Description	Author	Approved
V1	17-12-2021	For Council Approval	PC	BdW
V2	27-01-2022	For Client Approval - MUSIC assessment updated, preliminary FR5 energy ratings provided	PC	BdW
V3	06-04-2022	For Client Approval	PC	BdW
V4	14-04-2022	For Client Approval	PC	BdW
V5	18-04-2022	For Council Approval	PC	BdW

1. Introduction

This Sustainability Management Plan (SMP) has been prepared to assist the design, construction and operation of the proposed Summerset Community at 275 Manchester Road, Chirnside Park. This will include a retirement village consisting of 72 aged care beds, 28 assisted living apartments and 192 independent living units, and a residential subdivision consisting of 79 residential apartments, 64 residential rowhouses and 20 residential housing lots.

Sustainable Development Consultants have assessed the proposed development and provided input to the design team. This SMP captures initiatives necessary to ensure that the development meets the sustainability requirements of the Shire of Yarra Ranges, as outlined in Section 1.3 of this report.

This document has been prepared by Sustainable Development Consultants with reference to the Summerset – Chirnside Park Masterplan and Architectural drawings.

1.1 Site Description

The site at 275 Manchester Road, Chirnside Park is bounded by Manchester Road and Fletcher Road, to the east of Maroondah Highway. It is approximately 38km east of the Melbourne CBD and around 800m south of the Chirnside Park Shopping Centre.

The site is currently undeveloped. As part of this development, connections will be made between Manchester Road and Maroondah Highway, also connecting to Hedwig Drive.

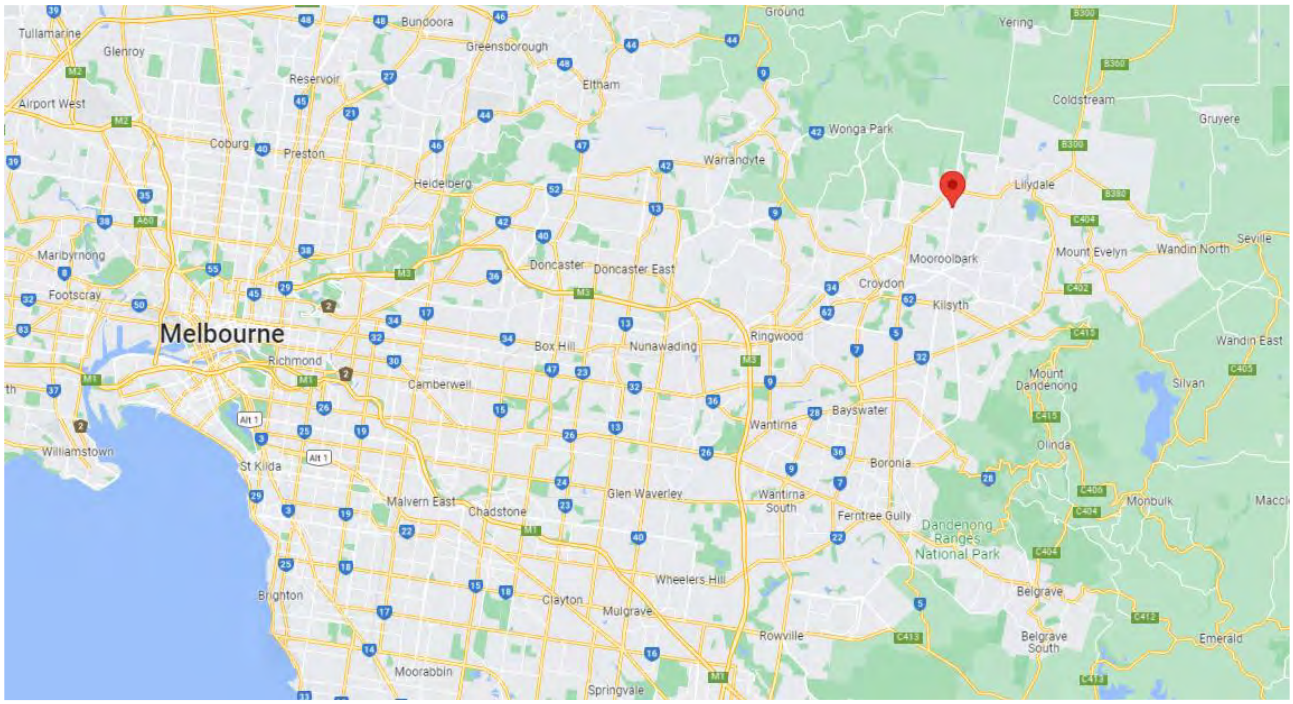


Figure 1: Location of 275 Manchester Road, Chirnside Park in relation to the Melbourne CBD (Source: Google Maps)

Figure 2: Aerial image of the Summerset Chirnside Park development site (Source: LandChecker, mark-up by SDC)

1.2 Development Summary

Set out in Table 1 below is a development summary for this project.

Table 1: Development Summary

Development Information		
Total Site Area		9.283 hectares
Carparking and Bikes		RACF Building: 49 car spaces at basement level, including 2 electric vehicle charging spaces, with 9 spaces outside the basement entrance and a further 13 spaces outside the Community Centre. 9 car spaces at basement level of the Fletcher Road Apartments. 48 car spaces at basement level of Apartment Building 1. 55 spaces at basement level of Apartment Building 2. 110 rowhouse spaces.
Retirement Village	Main RACF Building & Community Centre	4-storeys above basement level
		Wellness and community areas
		72-bed residential aged care facility (36 of which are memory support suites)
		28 assisted living apartments
	ILUs	192 dwellings. Includes townhouses, villas and under/overs, as well as the 9 Fletcher Road Apartments (total of 153 x 2-bed, 39 x 3-bed)
Residential Subdivision	Apartment Buildings	Buildings 1& 2: both 4 storeys above basement level 79 residential apartments (16 x 1-bed, 28 x 2-bed, 35 x 3-bed)
	Small House Lots	20 residential housing lots
	Rowhouses	64 residential row houses (49 x 2-bed, 15 x 3-bed)

1.3 Shire of Yarra Ranges Requirements

Shire of Yarra Ranges encourages land use and development that is energy and resource efficient, supports a cooler environment and minimises greenhouse gas emissions. Critical to achieving this vision is for development to meet appropriate environmental design standards.

The Shire of Yarra Ranges expects that this community should achieve best practice in environmentally sustainable development from the design stage through to construction and operation. To comply with the Victorian Planning Provisions, as well as Council's Liveable Climate Plan, this project is required to satisfy the objectives as set out within the following categories, where applicable:

- Energy Efficiency
- Water Resources
- Indoor Environment Quality
- Emissions
- Transport
- Waste and Environmental Management
- Land Use and Ecology
- Materials

This requires a Sustainability Management Plan (SMP) which demonstrates how for this project, the relevant policy objectives will be achieved.

The Shire of Yarra Ranges also requires that this community addresses the following planning scheme provisions:

- Clause 15.01-1S *Urban Design*
- Clause 15.02-1S *Energy and resource efficiency*
- Clause 18.02-1S *Sustainable personal transport*
- Clause 21.09-*3 Sustainability*
- Clause 53.03 *Site Layout and Building Massing*
- Clause 53.18 *Stormwater Management in Urban Development*

In September 2019, the Shire of Yarra Ranges declared a climate emergency and as part of this, are committed to enhanced Environmentally Sustainable Design.

1.4 ESD Assessment Tools

There are several calculators and modelling programs available in Victoria to assess proposed developments against benchmarks for ESD, as set by the Victorian government, local councils and the Building Code of Australia.

For this project, set out below are the assessment tools that have been adopted for this project.

1.4.1 BESS

The Built Environment Sustainability Scorecard (BESS) was developed by the Council Alliance for Sustainability in the Built Environment (CASBE). This tool assesses the energy and water efficiency, thermal comfort and overall environmental sustainability performance of new buildings or alterations. It was created to demonstrate that new development meets sustainability requirements as part of a planning permit application.

A BESS assessment has been conducted for the proposed development. This provides a guide as to the level of sustainability achieved by the proposed development in line with the Summerset masterplan requirements.

Each target area within the BESS tool generally receives a score of between 1% and 100%. A minimum score of 50% is required for the energy, water and indoor environment quality (IEQ) areas, whilst a 100% score is required for stormwater. An overall score of 50% for the project represents 'Best Practice' while a score over 70% represents 'Excellence'.

1.4.2 FIRSTRATE 5

FirstRate 5 is a house energy rating software that is accredited under the Nationwide House Energy Rating Scheme (NatHERS) Software Protocol to generate energy ratings for the purpose of demonstrating compliance of residential dwellings under the National Construction Code of Australia (NCC).

The software is used to assess the thermal performance of dwellings based on climate zone, materials used in a structure, positioning, orientation and building sealing. Higher scores are achieved through adoption of passive design principles such as improved building fabric elements (e.g. glazing and insulation), effective shading and promoting natural ventilation, among others.

A representative sample of all dwelling types has been modelled to determine the predicted heating and cooling loads and subsequent NatHERS ratings to provide an overview of how the development design is likely to perform. The results of these assessments have been provided within Appendix 2.

1.4.3 DESIGNBUILDER

DesignBuilder is a comprehensive analytical software package that analyses the energy and economic impacts of building-related selections such as architectural features; heating, ventilation and air-conditioning (HVAC) systems; building utilisation or scheduling, and financial options. DesignBuilder includes weather data including, latitude, longitude, altitude, time zone, and summer and winter design conditions; hourly observations information such as dry-bulb and wet-bulb temperatures (OADB, OAWB), humidity ration (HR), cloud cover (CCM), wind velocity, and outdoor air pressure (OAP). DesignBuilder will be used for both the thermal performance modelling (verification method JV3) and daylight modelling of the proposed Main Building.

Results of the thermal performance and daylight modelling will be provided as part of the detailed design stage of the project.

1.4.4 MODEL FOR URBAN STORMWATER IMPROVEMENT CONCEPTUALISATION V6 (MUSIC)

MUSIC is an urban stormwater modelling software that was developed to provide an easy-to-use universal treatment model for all urban stormwater systems. The tool is capable of simulating stormwater runoff, its treatment and quality during a rainfall event for catchment areas up to 100km^2 and can be used to assess and inform on stormwater treatment measures necessary to ensure the design of urban development meets the required Water Sensitive Urban Design Standards.

Details and results of the preliminary MUSIC assessment completed for the proposed development have been provided within Appendix 3.

2. Sustainability Initiatives

The following sections outline the initiatives that will be incorporated into the development throughout its design, construction and operation. Initiatives that are included to contribute towards the BESS benchmark have a reference next to them, e.g. (BESS Management 4.1). Some initiatives without the BESS reference have been included as they also contribute to the overall sustainability of the development. The ESD initiatives which align with Green Star Communities have been noted just for future reference purposes.

The following sections, as well as nominating the sustainability initiatives, also identify the party/parties responsible for implementation of the initiative, and the stage at which implementation will be demonstrated.

The following are the broad project stages:

1	Design Development	• Consultants develop conceptual design drawing to a detailed stage suitable as a basis for preparing working drawings - Integration of architectural, services, structure and site attributes • Checking compliance with all statutory requirements, codes and standards • Arranging special surveys or reports as required
2	Construction Documentation	• Architectural and services drawing sets completed • All specialist reports completed • All necessary planning and building consents obtained as required by authorities

3	Construction	• All work carried out onsite – site preparation, construction, alteration, extension, demolition • Purchase of all materials / certification • Evidence gathering from subcontractors • Commissioning
4	Post Occupancy	• Operation and Maintenance • Education – Building Users Guides

2.1 Building Management

Initiatives included in this section promote adoption of environmental initiatives at different stages of the project – not just in the project design stage.

Design Requirements	Responsibility & Implementation	Project Stage
Thermal Performance Modelling – Residential (BESS Management 2.2)		
Preliminary energy ratings have been undertaken for a sample of thermally unique dwellings. Refer Appendix 2 – FirstRate5 Assessment Results, Assumptions & Recommendations.	ESD Consultant	Design Development
Thermal Performance Modelling – Non-Residential (Management 2.3)		
Preliminary JV3 energy modelling will be undertaken in accordance with NCC 2019 Section J, during the detailed design stage of the project for the main Aged Care Facility (RACF) building. Completing energy modelling in the early project stages allows improved thermal performance outcomes, including passive design, to be selected before structural facets of building design become locked in, after which optimisation can be more difficult and costly. The energy modelling process highlights areas of the development which may be causing thermal performance issues, which can be troubleshooted via various iterations until a compliant and/or more positive outcome is found.	Architect/ ESD Consultant	Design Development/ Construction Documentation
Metering and Monitoring (BESS Management 3.2 & 3.3)		
Sub-meters will be provided for each major water and electricity usage in the community. These could include for: • Recycled water for irrigation • Recycled water for ILUs • Recycled water for the commercial laundry within the RACF Building • Potable water to ILUs, apartments and to the RACF Building This could also include electricity for: • Lighting • Power • Mechanical board • Solar PV (generation) RACF Building to be separately sub metered.	Services Consultant	Construction Documentation
Building User Guide (BESS Management 4.1)		
A Building User's Guide (BUG) will be developed and made available to building management, staff and residents. It will comprehensively feature the manuals of the systems installed in the development and offer relevant suggestions for sustainable operation.	Architect/ ESD Consultant	Construction Documentation

2.2 Energy Efficiency

Energy usage throughout the community will be minimised by the installation of efficient hot water systems, heating and cooling systems, lighting, and incorporating best practice building envelopes.

Design Requirements	Responsibility & Implementation	Project Stage
Thermal Performance Rating - Non-Residential (BESS Energy 1.1 & 2.1)		
Heating and cooling energy consumption for the RACF Building will be designed to meet the BESS energy consumption and greenhouse gas emissions reduction commitments, as well as the minimum requirements of NCC 2019 Section J. This is to be achieved with the specification of thermally efficient building fabric and high-performance HVAC systems.	ESD Consultant / Mechanical Engineer	Design Development
Thermal Performance Rating – Residential (BESS Energy 1.2, 2.1 & 2.2)		
Preliminary energy ratings have been undertaken for a sample of thermally unique dwellings to identify the building fabric requirements to achieve an energy rating of not less than 7.0 Stars for each ILU, and an average rating of 7.0 Stars for the apartments. Note: Any ILUs targeting Green Star Homes certification must achieve minimum 7.5 Stars. These results will be achieved with the nomination of appropriate building fabric elements including insulation and double-glazed fenestrations. Refer Appendix 2 – FirstRate5 Assessment Results, Assumptions & Recommendations.	ESD Consultant / Architect	Construction Documentation
Heating and Cooling Systems (BESS Energy 2.1, 2.2 & 2.3)		
Heating and cooling for the ILUs and apartments will be provided by energy efficient air conditioners (minimum 3-star energy rating, or if no star rating applies, achieve an Energy Efficiency Rating/Co-efficient of Performance (EER/COP) at least 10% more efficient than minimum allowed under the Minimum Energy Performance Standard (MEPS) for an equivalent sized unit). The RACF Building is to be provided with a VRV system for efficient heating and cooling. If mechanical heating and cooling is provided to the suites, each suite would be provided with a limited range of temperature control so that the system does not end up fighting itself due to occupants possibly wanting vastly different temperatures compared to those in adjoining spaces. Reed switches will be provided on operable windows to shut off the Fan Coil Units (FCUs) when windows are open.	Mechanical Engineer	Design Development
Carpark Ventilation		
The basement carpark is to be provided with natural ventilation.	Services Consultant	Design Development
Domestic Hot Water (BESS Energy 2.3, 2.4 & 3.2)		
Waste heat from the HVAC system will be used to pre-treat domestic hot water within the RACF Building. ILUs will be provided with either electric heat pump or electric instantaneous hot water systems. All pipework will be insulated to minimise distribution heat losses.	Services Consultant	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
External Lighting (BESS Energy 3.3)		
External lighting will be Light Emitting Diode (LED) and will have controls (e.g. motion detectors, and timers) to minimise consumption during off-peak times (e.g. 11pm-5am).	Electrical Engineer	Design Development
Clothes Drying (BESS Energy 3.4)		
The following townhouses have been provided with an outdoor foldable/retractable clothesline: • Townhouse Type 1-2: Ground Floor (18) • Townhouse Type 3-5: Lower Floor (24) • Villa Type 1, Villa Type 2 (5) • Under/over - Lower Units (41) In total, 88 of the 247 townhouses have been provided with outdoor clotheslines.	Architect	Design Development
Indoor Lighting - Residential (BESS Energy 3.5)		
Energy consumption from artificial lighting within the ILUs and apartments will be reduced by using LED lighting and by optimising daylight diffusion. A lighting level of 4.0 W/m² will not be exceeded. It is recommended that lighting levels do not exceed the maximum wattages listed in Table J6.2a of the 2019 BCA without the use of any adjustment factor.	Electrical Engineer	Design Development
Internal Lighting – Non-Residential (BESS Energy 3.7)		
The lighting (W/m^2) values for within the RACF Building must not exceed the maximum wattages listed in Table J6.2a of the NCC 2019. LEDs are to be employed throughout the development to provide energy efficient lighting. Downlights will be 'IC4' rated (Insulation Contact) to allow for insulation to be placed over the top, preventing air-leakage between habitable rooms and ceilings.	Electrical Engineer	Design Development
Energy Efficient Appliances		
All appliances provided throughout the Community (as part of the base building works) will be selected within one energy efficiency star of the best available.	Developer	Construction Documentation
Solar PV System		
125 solar panels are proposed to be installed on the roof of the RACF Building, and based on current market-leading 480W panels, this constitutes a 60kW system. Solar-facing panels, nominally 1m x 1.7m each in size, with 1m space around the edges of the roof to allow access for maintenance, are recommended to be installed with framing to allow panels to be set at 30° inclination. This PV system will reduce mains electricity use and the overall greenhouse gas emissions of the building by producing an estimated 66,000kWh of green electricity per year assuming an inclination of 30° and orientation to the west.[1]	Architect / Electrical Engineer	Design Development

[1] Solar PV annual energy generation calculated through PV Watts for the site located at 275 Manchester Road, Chirnside Park.

Design Requirements	Responsibility & Implementation	Project Stage
Lifts		
The design places lifts adjacent to stairs in all buildings, making it easier for users to have the choice of using the stairs. Energy efficient lifts will be specified that include measures to specifically reduce stand-by consumption such as: o Switching off control devices when the lift is not in motion & using more efficient power supply unit; o LED lights and display; and o Suspension specifically designed to reduce friction.	Service Consultant	Design Development
Building Sealing		
All windows, doors, exhaust fans and pipe penetrations will be constructed to minimise air leakage as required by the provisions outlined in Section J3 of the 2019 BCA. This will include the use of seals around operable windows and doors as well as caulking to pipe penetrations, and the addition of self-closing louvers or dampers to exhaust fans.	Architect	Design Development

2.3 Water Resources & Stormwater Treatment

Water will be used efficiently throughout the community via efficient fixtures and fittings, recycled water and low-water-use plants, which helps to reduce mains water requirements.

Design Requirements	Responsibility & Implementation	Project Stage
Water Fixtures and Fittings (BESS Water 1.1)		
The development will include efficient fittings and fixtures to reduce the volume of mains water used throughout. The following minimum Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Toilets – ≥4 Star WELS; • Urinals – 6 Star WELS (max. 0.8L/flush); • Taps (bathrooms and kitchens) – ≥5 Star WELS; and • Showerheads – 4 Star WELS (≥6.0 but ≤7.5L/min).	Architect / Services Consultant	Design Development
Water Efficient Appliances (BESS Water 1.1)		
Dishwashers will be minimum of 4-star WELS rated (only if installed by the developer in ILUs and apartments as part of the contracted building works).	Developer	Construction Documentation
Potable Water Use Reduction (BESS Water 1.1)		
The community will be connected to recycled water for irrigation, toilet and urinal flushing throughout. Rainwater will be captured from the top level roof area of the RACF Building within a rainwater tank with capacity of 80kL. Water should be filtered with a high-quality filter and will be re-used for all commercial laundry use requirements within the RACF Building. This 80kL tank will also be used to supplement irrigation demands, and will be topped up with recycled water in case of drought. The laundry demand for the development, based on daily washing of all bed linen with efficient Ozone Laundry Systems, is estimated at 40L/bed/day. Over a year, for 100 beds, this amounts to 1.46ML. With such a high expected water demand for laundry, the tank size specified is expected to be fully utilised.	Civil / Hydraulic Engineer	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Water Efficient Landscaping (BESS Water 3.1)		
A minimum 800m^2 of the landscaping will be selected as drought tolerant indigenous species without connection to an irrigation system and will include mulch and soil wetting agents to reduce the water requirements of these garden areas in future. A sub-surface drip irrigation system, with moisture sensor override if required, will be specified. Note that it is a requirement that some landscaped areas be designed so as not to require any watering after an initial establishment period. All remaining landscape will be irrigated by a dripper system supplied by recycled water, apart from the landscape around the perimeter of the RACF building which will be separately supplied by the basement detention tank.	Developer / Landscape Designer	Construction Documentation

Figure 3: Examples of drought tolerant landscaping that could be incorporated into the development design

Laundry Efficiency		
An Ozone Laundry System is recommended to be installed for the RACF Building commercial laundry room (see Figure 5 for a process diagram). This system uses ozone as a disinfecting agent. Ozone is a gas that oxidises and decomposes soil and other chemicals contained in clothes and linen. It is active in cold water, which significantly reduces the energy otherwise used for water heating. Ozone Laundry Systems are recommended due to their significant energy and water savings, shorter washing and drying times, extended linen life and reduction in chemical requirements. An Ozone Laundry system with heat recovery on all of the dryers will reduce water use by approximately 50%[2] and also reduce energy use by reusing the waste heat from the dryers.	Services Consultant	Design Development

[2] http://www.ozonelaundry.com.au/savings/

Figure 4: Ozone process diagram

Waterless HVAC Systems (BESS Water 4.1)		
Air-conditioning units will use air-cooled condenser components which will help to reduce the community's overall water usage while also preventing the growth and spread of legionella bacterium, which thrive in warm stagnant water.	Services Consultant	Construction Documentation
Fire System Test Water (BESS Water 4.1)		
A minimum 80% of fire safety system test water within the RACF Building will be either recirculated or stored for reuse rather than being discharged into the stormwater system. Hydrant and fire pump test water will all be recirculated or stored for reuse, accounting for the majority (>80%) of test water. The remaining test water, from sprinklers, will fall into the <20% category which is not to be recirculated or stored for reuse.	Services Consultant	Construction Documentation
Stormwater Management (BESS Stormwater 1.1)		
Stormwater management will be designed to achieve the Urban Stormwater Best Practice Environmental Management Guidelines, as evidenced by the compliant MUSIC assessment undertaken by Alluvium. Refer Appendix 3 – MUSIC Assessment & WSUD Report.	Architect / Civil Engineer / ESD Consultant	Design Development

2.4 Indoor Environment Quality

Indoor Environment Quality (IEQ) within the community will be improved through various initiatives which help to create a healthy indoor environment free from toxins with ample supply of daylight and outside air.

Design Requirements	Responsibility & Implementation	Project Stage
Daylight Access (BESS IEQ 1.4)		
Access to natural daylight is extremely important for all occupants and will provide an essential connection with nature and improve occupants' health and well-being. Glazing to memory support suites and assisted living apartments, ILUs, apartments and primary zones within the RACF Building will be designed to provide daylight access and external views in order to reduce reliance on artificial lighting and improve indoor amenity. This provision will be tempered by the requirement to control the solar gains which come through large windows. The provision of two large light wells within the RACF Building will contribute to daylight amenity within the adjoining spaces, ensuring that minimum 40% of regular use communal floor areas achieve at least 2% daylight factor overall. For non-residential nominated areas (staff rooms, café/restaurant, the pool and gym, libraries, nurses' station, salon, consulting room, commercial kitchen and commercial laundry) at least 40% of nominated floor area is to achieve a daylight factor greater than 2%. It is noted that the commercial kitchen and laundry will not comply, but they still must be factored into the assessment per BESS requirements. For sitting/activity, arts & crafts, living and dining areas (including ILU living areas): at least 80% of the total number of spaces is to achieve a daylight factor greater than 1% to 90% of the floor area of each living area as per BESS residential targets. As per Appendix 5, 88% of ILU and apartment living areas achieve this target. At least 80% of the aged-care suites are to achieve a daylight factor greater than 0.5% to 90% of the floor area in each room as per BESS residential aged-care targets for bedrooms. 100% of ILU and apartment bedrooms achieve a daylight factor greater than 0.5% to 90% of the floor area, whilst 88% of ILU and apartment kitchen/living areas achieve a daylight factor greater than 1% to 90% of the floor area. Refer to Appendix 5 for details. Daylight modelling of the RACF Building will be undertaken during the detailed design stage of the project.	ESD Consultant / Architect	Construction Documentation
Daylight Improvement		
Daylight penetration through windows/openings will be enhanced with the use of light internal colours, allowing for a better internal reflection of daylight.	Architect	Construction Documentation
Acoustic Comfort		
Acoustic comfort will be achieved ensuring good acoustic separation between spaces. Air-conditioning units will be placed away from windows where possible.	Acoustic/ Mechanical Engineer	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
Ventilation – Non-Residential (BESS IEQ 2.3)		
Operable windows will be specified to all bedrooms, suites and common areas, to facilitate natural ventilation. The RACF Building lounge and café/restaurant will be particularly well-ventilated, with the provision of large sliding doors out to the alfresco dining area. The central HVAC system of the RACF Building will provide outside air at a rate that exceeds the minimum required rate per person outlined in AS 1668.2:2012, by a minimum of 80%, to provide a comfortable and healthy internal environment to the occupants throughout.	Mechanical Engineer	Design Development
Mechanical Ventilation		
Within the ILUs and apartments, all kitchens will have a separate dedicated exhaust fan (range hood) which will not be recycled to any enclosed space within the building; it will be ducted directly outside. Likewise, the RACF Building commercial kitchen, laundry and suite bathrooms will have separate dedicated exhaust fans which will not be recycled to any enclosed space within the development.	Mechanical Engineer	Design Development
Cross Flow Ventilation		
The habitable rooms of the ILUs and apartments are to be designed to achieve natural cross flow ventilation through openable windows / sliding doors. This will enhance occupants' thermal comfort by providing fresh air and passive cooling opportunities. Fly screens and window locks will be provided to further encourage natural ventilation.	Architect	Construction Documentation
Double Glazing (BESS IEQ 3.1)		
All buildings will be fitted with double glazed windows, which can bring multiple benefits such as better acoustic protection from external noise sources[3], better thermal performance and reduced condensation forming on the inside of the glass which will in turn help prevent the formation of mould.	Architect	Construction Documentation
Orientation		
Residential Rowhouse living areas are designed to be north-facing to improve passive thermal control.	Architect	Design Development
Volatile Organic Compounds (VOCs) (BESS IEQ 4.1)		
All paints, adhesives, sealants and flooring will not exceed the limits outlined in Appendix 4. Alternatively, products with no VOCs will be selected. Paints such as eColour, or equivalent, will be considered.	Architect / Builder	Construction Documentation
Formaldehyde Minimisation (BESS IEQ 4.1)		
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Alternatively, products with no formaldehyde will be specified. Emissions limits are listed in Appendix 4. Products such as Ecological Panel – 100% post-consumer recycled wood (or similar) will be considered for use within the development.	Architect / Builder	Construction Documentation
Artificial Lighting Level		
A higher illuminance will be provided for task areas such as the commercial kitchen sinks/benches and over bathroom basins, to ensure that there is adequate light to carry out tasks in these areas.	Electrical Engineer	Construction Documentation

[3] Window and glass specifications should be reviewed by an acoustic consultant to ensure that specifications will meet acoustic objectives while maintaining thermal performance requirements.

2.5 Building, Construction and Waste Management

Initiatives included in building, construction and waste management promote adoption of environmental initiatives at different stages of the project – not just in the project design stage.

Design Requirements	Responsibility & Implementation	Project Stage
Operational Waste – Food & Garden Waste (BESS Waste 2.1)		
Dedicated bin spaces will be provided for the following streams across the community: • General waste (landfill waste); • Organic & green waste; • Commingled recyclables. **Villa / Townhouse ILUs** will each be provided with under-bench receptacles for general waste, food waste and recycling. Collection bins for general waste and recycling are to be provided within the garage of each dwelling. A communal tumbler compost bin is to be provided at each pocket park for residents to empty their full food waste receptacles into as required, with the composted material available for use on the communal gardens. Green waste associated with all private and communal gardens throughout the Retirement Village is to be managed and collected by a private contractor as required. Summerset staff will transport hard waste / e-waste directly from the ILUs to the dedicated hard waste storage area within the RACF Building bin store for collection. **Fletcher Road Apartment Block ILUs** will each be provided with under-bench receptacles for general waste, food waste and recycling. A dedicated bin store will be provided on ground level containing shared collection bins for general waste and recycling, a bin tug, and a dedicated storage area for hard waste / e-waste. A single chute system fitted with mechanical diverter is to be provided, with intakes for general waste and recycling at each level of the apartment building. A communal tumbler compost bin is to be provided at each pocket park for residents to empty their full food waste receptacles into as required, with the composted material available for use on the communal gardens. **RACF Building** communal areas, staff/admin, kitchen, dining and BOH areas are to be provided with bins for general waste, recycling and food waste. Summerset staff responsible for disposing of waste from these areas. A dedicated RACF bin store is to be provided within the basement of the RACF building for general waste, food waste, recycling, along with a hard waste storage area, a cardboard baler and e-waste storage area. A twin-chute system is to be provided with intakes at each level of the RACF building, for general waste and recycling, discharging into the appropriate bins within the RACF building bin store. RACF beds are to be provided only with general waste receptacles, which staff to take waste to the bin chutes. ALAs are to be provided with receptacles for general waste and recycling, with residents responsible for taking their own waste to the bin chutes.	Architect/ Building Owner	Design Development/ Post Occupancy

Design Requirements	Responsibility & Implementation	Project Stage
Rowhouses and Housing Lot dwellings will each be provided with receptacles for general waste, food waste, recycling and glass, with waste to be stored in each dwelling's garage and/or private open space. **Apartment Blocks** will be provided with receptacles for general waste, food waste, recycling and glass, with residents responsible for disposing their directly into the collection bins within the bin store at basement level. Refer Waste Management Plan by Ratio Consultants for further detail.		
Construction Waste Management		
The builder will develop a construction waste management plan (CWMP) for the construction phase. This will include the following: • Waste generation; • Any waste systems; • Minimisation Strategy; • Performance / Reduction targets; • Bin quantity and size; • Collection frequency; • Signage; and • Monitoring and reporting including frequency and method. The CWMP will include a requirement for not less than 75% of all civil works and built form construction waste to be recycled or re-used. The CWMP will require that all hazardous substances, pollutants and contaminants must be managed and disposed of in accordance with all state regulatory requirements. Where these materials are treated, or used on site, they must be in accordance with a sanctioned remediation process. The CWMP may form part of a broader Construction Environmental Management Plan (CEMP).	Builder	Construction Documentation
Operational Waste – Convenience of Recycling (BESS Waste 2.2)		
Separate waste and recycling facilities will be provided throughout the RACF building and dwellings, and be provided in a way that ensures they are equally convenient at point of use. This will help encourage staff and residents to separate their waste and recycling at the earliest point of disposal. Recycling facilities will be adjacent general waste, but bin colouring and signage will ensure distinction between different waste streams.	Architect/ Building Owner	Design Development

Figure 5: Examples of kitchen waste management bins incorporated into joinery

2.6 Building Materials

Materials initiatives help reduce the use of virgin materials and generating waste and promote the use of materials with lower embodied energy and environmental impacts.

Design Requirements	Responsibility & Implementation	Project Stage
Concrete		
A minimum of 50% of the concrete mix will contain recycled water.	Builder / Structural Engineer	Construction Documentation
Steel		
Wherever possible, steel will be sourced from a Responsible Steel Maker[4]. Reinforcing steel for the project will be manufactured using energy reducing processes.	Builder / Structural Engineer	Construction Documentation
Timber		
All timber for outdoor areas will be Forest Stewardship Council (FSC) certified.	Architect	Construction Documentation
Cables, pipes, floors and blinds		
All standard uses of cables, pipes, flooring and blinds within the development will either not contain any PVC or will be sourced from a manufacturer/supplier that adheres to the Green Building Council of Australia's *Best Practice Guidelines for PVC in the Built Environment*.	Services Consultant	Construction Documentation
End of Life Waste Performance		
The design life of the finishes to all common areas within the RACF Building will be at least 10 years, barring minor wear and tear or minor repairs.	Developer	Contractual Agreement
Recycled Materials in Public Areas		
Wherever permanent outdoor furniture is proposed across the community, it is recommended that park benches etc. be made from recycled plastic or other recycled materials.	Architect	Construction Documentation

[4] A Responsible Steel Maker must have facilities with a currently valid and certified ISO 14001 Environmental Management System (EMS) in place and be a member of the World Steel Association's (WSA) Climate Action Program (CAP).

Design Requirements	Responsibility & Implementation	Project Stage
Flooring (BESS IEQ 4.1)		
All flooring will be manufactured from materials/products certified under any of the following: • Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS) v1.2; • Ecospecifier GreenTag GreenRate V3.1; • Good Environmental Choice (GECA); and/or • The Institute for Market Transformation to Sustainability (MTS) Sustainable Materials Rating Technology Standard Version 4.0 – SmaRT 4.0. Alternatively, floor coverings must be durable, include some eco-preferred content, be modular and/or come from a manufacturer with a product stewardship program and ISO 14001certification. Carpet will be sourced from a manufacturer where a recycling scheme is available.	Builder/ Architect	Construction Documentation

Figure 6: Examples of approved environmental labels for products which may be incorporated for the development

2.7 Transport

Design Requirements	Responsibility & Implementation	Project Stage
Electric Vehicle Infrastructure (BESS Transport 2.1)		
Two EV charging points have been documented within the RACF Building basement, along with additional charging infrastructure to facilitate the increased uptake of electric vehicles in the future. Provision will be made for EV charging infrastructure to all ILU garages and apartment basements to accommodate charging stations in the future as demand requires it. A standard GPO will be provided in each garage for this purpose.	Electrical Engineers/ Services Consultant	Design Development
Bicycle Parking		
4 bicycle parking spaces will be provided at ground level outside the RACF Building for visitors, and 2 bicycle parking spaces with end of trip facilities (showers, lockers) will be provided for staff working in the RACF Building. The Fletcher Road apartments will be provided with 2 resident and 1 visitor bicycle parking space.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Apartment Buildings 1 and 2 will *each* be provided with 8 resident and 4 visitor bicycle parking spaces. A standard GPO will be provided to charge electric bikes/cars within the garages of ILUs. There are a few bike trails nearby, including Brushy Creek Trail (Maroondah Hwy (Exeter Road) to Mooroolbark Station, and the Mullum Mullum Trail for those residents looking a longer ride.		
Access to Public Transport		
The proposed development has direct access within 500m walking distance to the following public transport options: Bus Routes • 664: Chirnside Park - Knox City via Croydon & Bayswater (<100m away) • 675: Chirnside Park – Mooroolbark via Manchester Road (100m away) • 964: Croydon - Lilydale (100m away) • 963: Ringwood - Lilydale (100m away) • TeleBuses 2 & 3 Mooroolbark Station – Chirnside Park SC (500m away) • 685: Healesville – Lilydale (500m away) • TeleBus 1 Lilydale Station – Chirnside Park SC (500m away)	Inherent in Location	

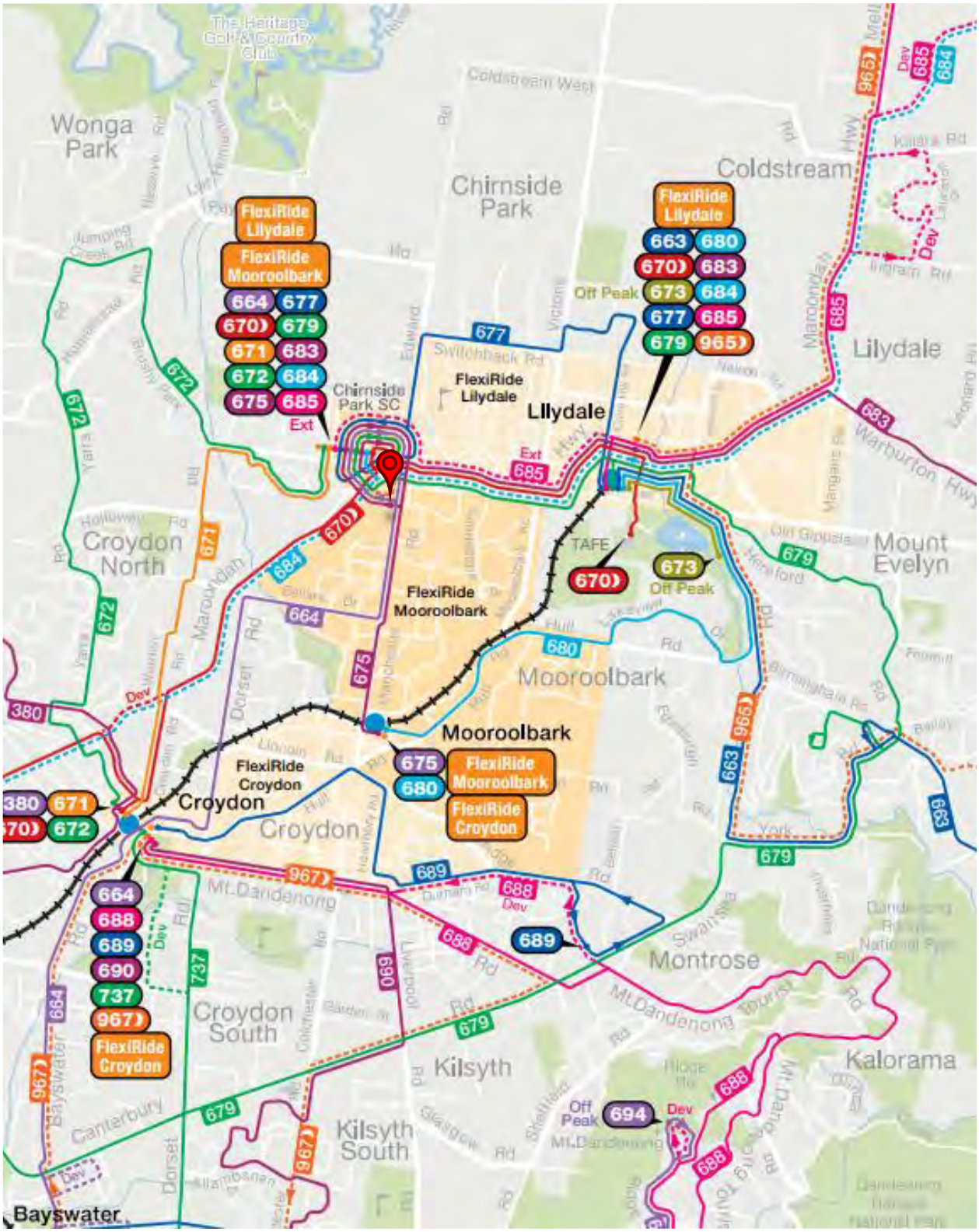


Figure 7: PTV Local Area Map indicating the public transport options surrounding 275 Manchester Road, Chirnside Park (red balloon)

2.8 Urban Ecology

Design Requirements	Responsibility & Implementation	Project Stage
Communal Spaces (BESS Urban Ecology 1.1)		
The development features high quality indoor and outdoor communal spaces. The development includes various amenities such as TV lounges, libraries, a chapel/cinema, communal lounge/dining areas, and an alfresco dining area. The community will also feature extensive landscaped gardens, which will be accessible to residents and staff alike.	Architect / Landscape Architect	Design Development
Vegetation (BESS Urban Ecology 2.1)		
31% of the site is shown to be covered with vegetation through the inclusion of landscaping across the development. A variety of indigenous species will be included, to enhance local biodiversity and encourage native birds to visit the space.	Architect / Landscape Architect	Design Development
Light External Colours		
Light external colours are excellent in reducing the Urban Heat Island Effect (UHIE), especially if applied to roofing. UHIE occurs when the hard surfaces in built up areas, such as roads and buildings, absorb the heat of the sun during the day and release this at night. During summer this can lead to significantly higher night-time temperatures, which increases the need to use air conditioners and makes for a generally unpleasant environment. The use of light external colours, solar PV, as well as plentiful vegetation reduces this phenomenon. The selection of light-coloured roofs (Colorbond 'Surfmist') and light-coloured driveways will contribute to UHIE reduction.	Architect	Design Development
Refrigerant Ozone Depletion (ODP)		
All HVAC refrigerants used in the community will be selected to have an Ozone Depletion Potential (ODP) of zero.	Mechanical Engineer	Construction Documentation
Insulation Ozone Depletion Potential (ODP)		
All thermal insulation used in the community will not contain any ozone-depleting substances and will not use any in its manufacturing.	Architect	Construction Documentation
Light Pollution		
No external luminaire on the project will have an Upward light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation. External lighting will be designed to avoid light spill off the site or into the night sky.	Architect/ Electrical Engineer	Schematic Design
Community Food Garden		
Community vegetable gardens are provided in pocket parks, providing a great meeting space for residents, as a means of encouraging heathy eating, and encouraging exercise and socialising. Composters are provided within the pocket parks, where residents may take their organic/green waste.	Architect / Landscape Architect	Design Development

2.9 Additional ESD Initiatives

Design Requirements	Responsibility & Implementation	Project Stage
Community Resilience (BESS Innovation)		
A Community Resilience Plan is to be developed prior to the occupation of any habitable building within the community, addressing preparation, during- and post-disaster communication, safety, and response. CRP to be aligned with any local disaster management plans, made available to residents/staff, and cover: • Project-specific risks to the community from extreme events. • Key community contacts. • Emergency contacts. • Emergency shelter locations. • Information on development of an emergency plan/kit. • List of communications channels. • Guidelines for disaster prevention. • Emergency procedures (during and after), and • Checklists.	Specialist consultant	Prior to occupancy
Community Users' Guide (BESS Innovation)		
A Community Users' Guide is to be prepared, made publicly available and provided to all residents/employees. The guide must include relevant non-technical information pertaining to the sustainability attributes of the project, outlining what is available to project occupants and what they can do to support the design. Community Users' Guide to cover: • Local community groups, events and materials to engage with other community members. • Map of cycle paths and the location of recreational facilities. • Location and arrangements for participating in local food gardens (if applicable). • Waste management and recycling. • Public transport availability, car parking and cyclist facilities, and • Community Resilience Plan.	Developer	Prior to occupancy
Biophilic Design (BESS Innovation)		
Plants, water features, sculptures and fountains spread throughout the community, could prove beneficial to those residents who require sensory stimulation and/or positive mental engagement.	Architect / Landscape Architect	Design Development
High Quality Staff Support (BESS Innovation)		
High quality staff support will be put in place for site workers to promote mental and physical health outcomes and knowledge on sustainable practices. This may be through on-site, off-site and/or online educational programs. Examples include Beyond Blue, Headspace, and Mates in Construction. At least three distinct issues must be addressed, including mental health (e.g. heathy eating, active lifestyle, depression, suicide prevention, alcohol, tobacco). Additionally, on-site training for all contractors and subcontractors who are present on site for at least three days, covering information on Green Star Communities, Green Star Homes or any other certifications targeted, the value of certification, and the role site workers play in delivering a sustainable certified building, is to be provided.	Builder	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
Healthy and Active Living – Footpaths (BESS Innovation)		
Footpaths throughout the community are to be provided in accordance with AMCORD for pedestrian facilities, with streets designed for the safe and convenient movement of pedestrians, with consideration to people with disabilities and the elderly.	Architect	Construction Documentation
Community Development Plan (BESS Innovation)		
A publicly available community development plan is to be developed for the project and to be implemented. The plan must include: • Introduction and objectives. • Who is responsible for implementing the plan, and their responsibilities. • How the plan will be monitored, evaluated and updated, and how often. • Community vision, historical context, population and socio-economic characteristics. • Summary of community and stakeholder consultation issues that informed the preparation of the plan, through research or earlier consultation and feedback. • Proposed community development initiatives and activities, when and who is responsible. • Timetable for regular review of the plan (at least once per 5 years) with a ≤2-page summary of each review highlighting outcomes and recommendations.	Developer	Prior to occupancy

3. Conclusion

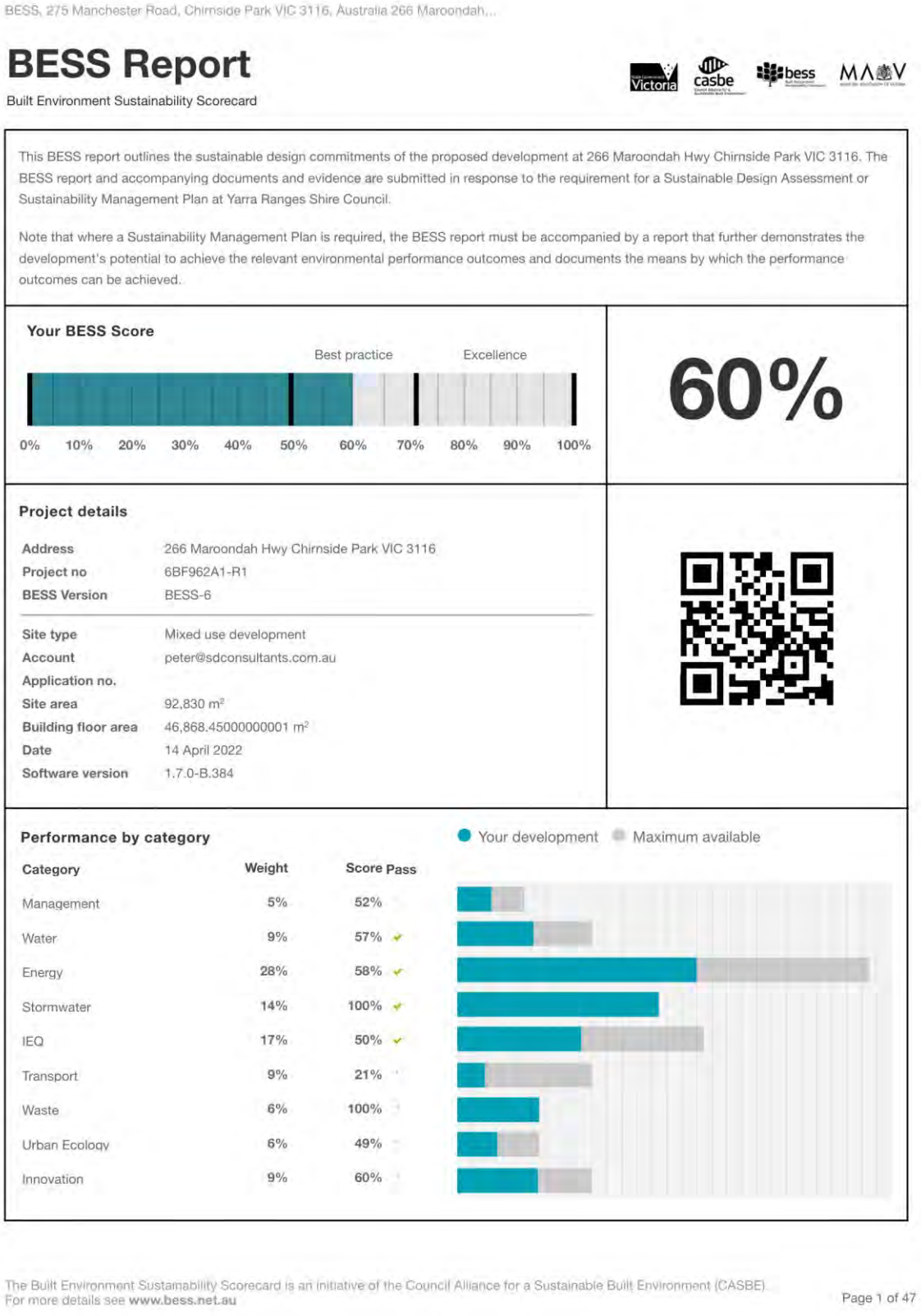
As set out in this SMP the proposed Summerset Community at 275 Manchester Road, Chirnside Park will meet best practice requirements through the initiatives outlined in this report including the use of energy efficient systems, recycled water, solar PV and the use of low to zero VOC content materials, as well as reduced environmental impacts during the construction stage.

The initiatives that have been included within this SMP all have a proven track record of serving their individual purpose and can be easily maintained with any failures obvious to the residents, staff and building management. This helps to ensure the ongoing sustainability of the buildings, as the systems installed in the beginning are maintained for purpose throughout the life of each building.

The implementation of this SMP requires a clear process that will include:

- Full integration with architectural and building services plans and specifications;
- Endorsement of the SMP with town planning drawings; and
- SMP initiatives to be included in plans and specifications for building approval.

Appendix 1 – BESS Assessment



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BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 266 Maroondah Hwy Chirnside Park VIC 3116. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Yarra Ranges Shire Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

Your BESS Score

Best practice Excellence

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

60%

Project details

Address	266 Maroondah Hwy Chirnside Park VIC 3116
Project no	6BF962A1-R1
BESS Version	BESS-6
Site type	Mixed use development
Account	peter@sdconsultants.com.au
Application no.	
Site area	92,830 m²
Building floor area	46,868.45000000001 m²
Date	14 April 2022
Software version	1.7.0-B.384

Performance by category

Your development Maximum available

Category	Weight	Score	Pass
Management	5%	52%	
Water	9%	57%	✓
Energy	28%	58%	✓
Stormwater	14%	100%	✓
IEQ	17%	50%	✓
Transport	9%	21%	
Waste	6%	100%	
Urban Ecology	6%	49%	
Innovation	9%	60%	

The Built Environment Sustainability Scorecard is an initiative of the Council Alliance for a Sustainable Built Environment (CASBE).
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Buildings

Name	Height	Footprint	% of total footprint
ILUs	2	1,988 m²	9%
Main RACF Building	4	4,242 m²	20%
Rowhouses	3	5,008 m²	24%
House Lots	1	5,654 m²	27%
Apartment 1	4	1,480 m²	7%
Apartment 2	4	1,521 m²	7%
Fletcher Rd Apartments	4	705 m²	3%

Dwellings & Non Res Spaces

Dwellings

Name	Quantity	Area	Building	% of total area
Detached dwelling				
18 House Lot 2	10	118 m²	House Lots	2%
17 House Lot 1	10	118 m²	House Lots	2%
1 - V2	5	112 m²	ILUs	1%
Total	**25**	**2,919 m²**	**6%**	
Townhouse				
26 R6	11	171 m²	Rowhouses	4%
25 R5	16	138 m²	Rowhouses	4%
24 R2	10	187 m²	Rowhouses	3%
23 R1C	11	132 m²	Rowhouses	3%
21 R1A	11	132 m²	Rowhouses	3%
22 R2	5	187 m²	Rowhouses	1%
Total	**64**	**9,800 m²**	**20%**	
Apartment				
5 - UO - Over	20	95.9 m²	ILUs	4%
4 - UO - Under	20	97.8 m²	ILUs	4%
3 - UO - Over	21	95.9 m²	ILUs	4%
2 - UO - Under	21	97.8 m²	ILUs	4%
Apt Bld 1 L3 NE APT 33 T-D	14	117 m²	Apartment 2	3%
15 - ILU TH5 - L1	12	120 m²	ILUs	3%
Apt Bld 1 L3 W APT 36 T-B	13	76.0 m²	Apartment 1	2%
16 - ILU TH5 - L2	12	97.7 m²	ILUs	2%
14 - ILU TH5 - GL	12	78.3 m²	ILUs	2%
12 - ILU TH4 - GL	8	118 m²	ILUs	2%
9 - ILU TH2 - L1	12	99.2 m²	ILUs	2%
8 - ILU TH2 - GL	12	113 m²	ILUs	2%
Apt Bld 1 L3 E APT 31 T-A	10	58.8 m²	Apartment 1	1%
Apt Bld 1 L1 E APT 13 T-A	11	58.8 m²	Apartment 1	1%
Apt Bld 1 L1 W APT 18 T-B	12	76.0 m²	Apartment 1	1%
Apt Bld 1 G SE cnr APT 5 T-B	8	80.3 m²	Apartment 1	1%
13 - ILU TH4 - L1	8	103 m²	ILUs	1%
7 - ILU TH1 - L1	6	99.2 m²	ILUs	1%

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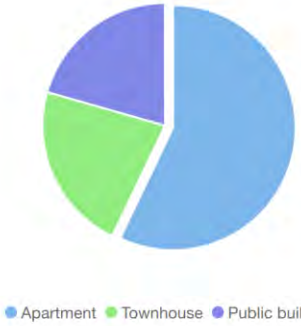
6 - ILU TH1 - GL	6	117 m²	ILUs	1%
Apt Bld 1 L3 SW cnr APT 34 T-B	5	76.2 m²	Apartment 1	< 1%
Apt Bld 1 L3 NW cnr APT 38 T-C	4	102 m²	Apartment 1	< 1%
Apt Bld 1 G NW cnr APT 11 T-C	4	102 m²	Apartment 1	< 1%
F.Rd Apt L1 N APT 7 T-A	4	77.5 m²	Fletcher Rd Apartments	< 1%
F.Rd Apt GL NW APT 3 T-B	3	89.5 m²	Fletcher Rd Apartments	< 1%
11 - ILU TH3 - L1	4	117 m²	ILUs	< 1%
10 - ILU TH3 - GL	4	86.6 m²	ILUs	< 1%
Total	**266**	**25,102 m²**	**53%**	

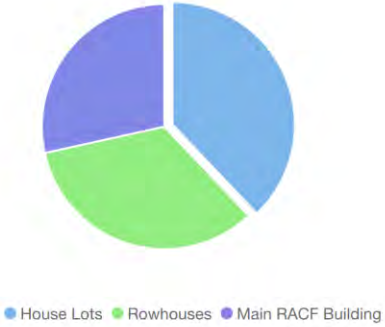
Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Public building				
Main Building	1	9,045 m²	Main RACF Building	19%
Total	**1**	**9,045 m²**	**19%**	

Building Type composition



Building composition



Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.1	Individual utility meters annotated	To be printed Ensure that electrical documentation clearly shows individual utility meters.	✔
Management 3.2	Individual utility meters annotated	To be printed Ensure that electrical documentation clearly shows individual utility meters.	✔
Management 3.3	Common area submeters annotated	To be printed Ensure that electrical documentation clearly shows common areas with separate utility meters.	✔
Water 3.1	Water efficient garden annotated	To be printed Refer Landscape documentation.	✔

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Credit	Requirement	Response	Status
Energy 3.3	External lighting sensors annotated	To be printed Ensure that electrical documentation shows external lighting sensors.	✔
Energy 3.4	Clothes line annotated (if proposed)	To be printed Architectural documentation shows private outdoor clothesline to nominated ILUs.	✔
Stormwater 1.1	Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)	To be printed Stormwater management systems determined by Alluvium. An 80kL rainwater tank, raingardens and recycled water connection are proposed.	✔
IEQ 1.1	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	To be printed Measured from documentation.	✔
IEQ 1.2	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	To be printed Measured from documentation.	✔
IEQ 1.5	Floor plans with compliant bedrooms marked	To be printed All bedrooms are provided with a window.	✔
IEQ 3.1	Glazing specification to be annotated	To be printed Refer SMP Appendix 2.	✔
Transport 2.1	Location of electric vehicle charging infrastructure	To be printed Carparks with EV charging shown at basement level.	✔
Waste 2.1	Location of food and garden waste facilities	To be printed Waste room to show FOGO bins.	✔
Waste 2.2	Location of recycling facilities	To be printed Ensure that the bin room clearly shows recycling and general waste facilities.	✔
Urban Ecology 1.1	Size and location of communal spaces	To be printed Communal spaces are shown on documentation.	✔
Urban Ecology 2.1	Vegetated areas	To be printed Landscape and Architectural documentation shows all vegetated areas.	✔

Supporting evidence

Credit	Requirement	Response	Status
Management 2.2	Preliminary NatHERS assessments	To be printed FirstRate5 Assessment Results Refer SMP Appendix 2.	✔
Energy 1.1	Energy Report showing calculations of reference case and proposed buildings	To be printed FirstRate5 Assessment Results Refer SMP Appendix 2.	✔
Energy 3.5	Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.	To be printed Electrical Documentation Ensure the Electrical documentation shows IPD and lighting types.	✔
Energy 3.6	Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.	To be printed Electrical Documentation Ensure the Electrical documentation shows IPD and lighting types.	✔

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Credit	Requirement	Response	Status
Energy 3.7	Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.	To be printed Electrical documentation Ensure the Electrical documentation shows IPD and lighting types.	✓
Stormwater 1.1	STORM report or MUSIC model	To be printed MUSIC Assessment MUSIC assessment completed by Alluvium. Referenced in SMP Appendix 3.	✓
IEQ 1.1	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	To be printed Daylight Modelling To be provided during the detailed design stage.	✓
IEQ 1.2	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	To be printed Daylight Modelling To be provided during the detailed design stage.	✓
IEQ 1.4	A short report detailing assumptions used and results achieved.	To be printed Daylight Modelling To be provided during the detailed design stage.	✓
IEQ 1.5	A list of compliant bedrooms	To be printed N/A All bedrooms comply	✓
IEQ 3.1	Reference to floor plans or energy modelling showing the glazing specification (U-value and Solar Heat Gain Coefficient, SHGC)	To be printed FirstRate5 Assessment Results Refer SMP Appendix 2.	✓

Credit summary

Management Overall contribution 4.5%

	52%
1.1 Pre-Application Meeting	0%
2.1 Thermal Performance Modelling - Single Dwelling	0%
2.2 Thermal Performance Modelling - Multi-Dwelling Residential	100%
2.3 Thermal Performance Modelling - Non-Residential	0%
3.1 Metering	100%
3.2 Metering	100%
3.3 Metering	100%
4.1 Building Users Guide	100%

Water Overall contribution 9.0%

	Minimum required 50%	57%	✓ Pass
1.1 Potable water use reduction		40%	
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use Reduction		100%	

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Energy Overall contribution 27.5%

	Minimum required 50%	58%	Pass
1.1 Thermal Performance Rating - Non-Residential		12%	
1.2 Thermal Performance Rating - Residential		50%	
2.1 Greenhouse Gas Emissions		100%	
2.2 Peak Demand		0%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		N/A	Scoped Out
		No gas connection in use.	
2.5 Wood Consumption		N/A	Scoped Out
		No wood heating system present.	
3.1 Carpark Ventilation		N/A	Scoped Out
		49 spaces	
3.2 Hot Water		100%	
3.3 External Lighting		100%	
3.4 Clothes Drying		74%	
3.5 Internal Lighting - Residential Single Dwelling		100%	
3.6 Internal Lighting - Residential Multiple Dwellings		100%	
3.7 Internal Lighting - Non-Residential		100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	Scoped Out
		No cogeneration or trigeneration system in use.	
4.2 Renewable Energy Systems - Solar		0%	
4.4 Renewable Energy Systems - Other		N/A	Disabled
		No other (non-solar PV) renewable energy is in use.	
4.5 Solar PV - Houses and Townhouses		0%	

Stormwater Overall contribution 13.5%

	Minimum required 100%	100%	Pass
1.1 Stormwater Treatment		100%	

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IEQ Overall contribution 16.5%

	Minimum required 50%	50%	✔ Pass
1.1 Daylight Access - Living Areas		66%	
1.2 Daylight Access - Bedrooms		100%	
1.3 Winter Sunlight		0%	
1.4 Daylight Access - Non-Residential		40%	✔ Achieved
1.5 Daylight Access - Minimal Internal Bedrooms		100%	
2.1 Effective Natural Ventilation		0%	
2.2 Cross Flow Ventilation		0%	
2.3 Ventilation - Non-Residential		43%	✔ Achieved
3.1 Thermal comfort - Double Glazing		100%	
3.2 Thermal Comfort - External Shading		0%	
3.3 Thermal Comfort - Orientation		0%	
3.4 Thermal comfort - Shading - Non-residential		0%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%	
4.1 Air Quality - Non-Residential		100%	

Transport Overall contribution 9.0%

	21%
1.1 Bicycle Parking - Residential	0%
1.2 Bicycle Parking - Residential Visitor	0%
1.3 Bicycle Parking - Convenience Residential	N/A ⊘ Disabled
	Credit 1.1 must be achieved first.
1.4 Bicycle Parking - Non-Residential	0%
1.5 Bicycle Parking - Non-Residential Visitor	0%
1.6 End of Trip Facilities - Non-Residential	N/A ⊘ Disabled
	Credit 1.4 must be complete first.
2.1 Electric Vehicle Infrastructure	100%
2.2 Car Share Scheme	0%
2.3 Motorbikes / Mopeds	0%

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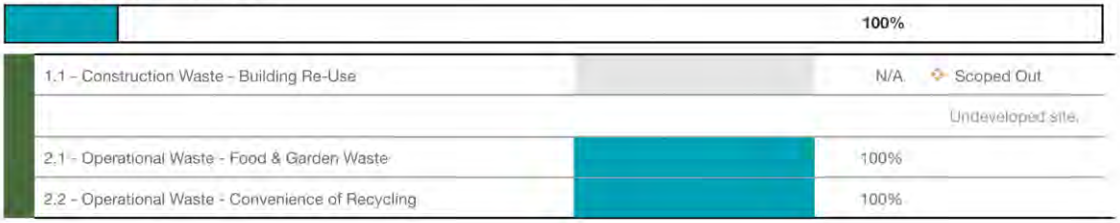
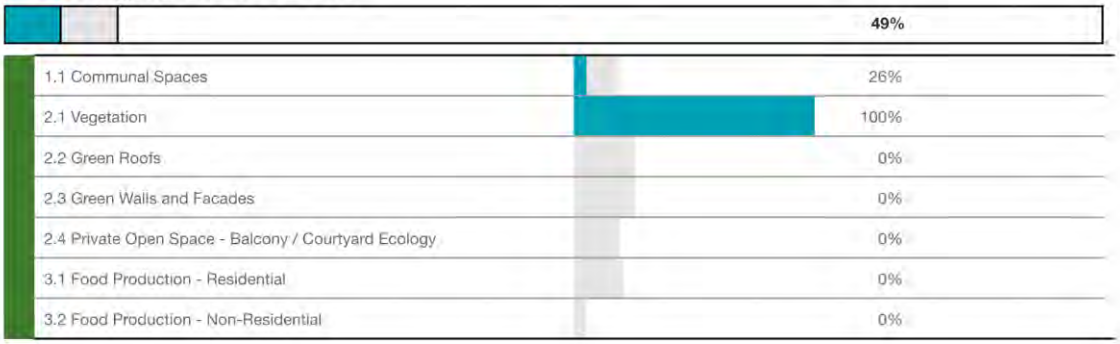
Waste Overall contribution 5.5%



Urban Ecology Overall contribution 5.5%



Innovation Overall contribution 9.0%

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Credit breakdown

Management Overall contribution 2%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 40.2% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.1 Thermal Performance Modelling - Single Dwelling		0%
Score Contribution	This credit contributes 1.7% towards the category score.	
Criteria	Has a preliminary NatHERS rating been undertaken?	
Question	Criteria Achieved ?	
Detached dwelling	No	
2.2 Thermal Performance Modelling - Multi-Dwelling Residential		100%
Score Contribution	This credit contributes 20.0% towards the category score.	
Criteria	Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings?	
Question	Criteria Achieved ?	
Townhouse	Yes	
Apartment	Yes	
2.3 Thermal Performance Modelling - Non-Residential		0%
Score Contribution	This credit contributes 5.2% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2019 Section J1.5?	
Question	Criteria Achieved ?	
Public building	No	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2019 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Public building	No	
3.1 Metering		100%
Score Contribution	This credit contributes 7.2% towards the category score.	
Criteria	Have utility meters been provided for all individual dwellings?	
Question	Criteria Achieved ?	
Apartment	Yes	

3.2 Metering		100%
Score Contribution	This credit contributes 2.6% towards the category score.	
Criteria	Have utility meters been provided for all individual commercial tenants?	
Question	Criteria Achieved ?	
Public building	Yes	
3.3 Metering		100%
Score Contribution	This credit contributes 9.8% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Apartment	Yes	
Public building	Yes	
4.1 Building Users Guide		100%
Score Contribution	This credit contributes 13.4% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	Yes	

Water Overall contribution 5% Minimum required 50%

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools
Project Water Profile Question	
Do you have a reticulated third pipe or an on-site water recycling system?:	Yes
Are you installing a swimming pool?:	No
Are you installing a rainwater tank?:	Yes
Reticulated third pipe or an on-site water recycling system	
Recycled Profile Name:	Third pipe
Irrigation area connected to reticulated third pipe or an on-site water recycling system only (i.e. not also connected to rainwater system):	–
Water Efficient Garden?:	–
Other external water demand connected to reticulated third pipe or an on-site water recycling system only (i.e. not also connected to rainwater system):	–
Water fixtures, fittings and connections	

Building:	
Main Building	Main RACF Building
1 - V2 2 - UO - Under 3 - UO - Over 4 - UO - Under 5 - UO - Over 6 - ILU TH1 - GL 7 - ILU TH1 - L1 8 - ILU TH2 - GL 9 - ILU TH2 - L1 10 - ILU TH3 - GL 11 - ILU TH3 - L1 12 - ILU TH4 - GL 13 - ILU TH4 - L1 14 - ILU TH5 - GL 15 - ILU TH5 - L1 16 - ILU TH5 - L2	ILUs
17 House Lot 1 18 House Lot 2	House Lots
F.Rd Apt GL NW APT 3 T-B F.Rd Apt L1 N APT 7 T-A	Fletcher Rd Apartments
21 R1A 22 R2 23 R1C 24 R2 25 R5 26 R6	Rowhouses
Apt Bld 1 G SE cnr APT 5 T-B Apt Bld 1 G NW cnr APT 11 T-C Apt Bld 1 L1 W APT 18 T-B Apt Bld 1 L1 E APT 13 T-A Apt Bld 1 L3 NW cnr APT 38 T-C Apt Bld 1 L3 W APT 36 T-B Apt Bld 1 L3 E APT 31 T-A Apt Bld 1 L3 SW cnr APT 34 T-B	Apartment 1
Apt Bld 1 L3 NE APT 33 T-D	Apartment 2
Showerhead: All	4 Star WELS (>= 6.0 but <= 7.5)

Bath:	
Main Building	Default or unrated
1 - V2	Scope out
2 - UO - Under	
3 - UO - Over	
4 - UO - Under	
5 - UO - Over	
6 - ILU TH1 - GL	
7 - ILU TH1 - L1	
8 - ILU TH2 - GL	
9 - ILU TH2 - L1	
10 - ILU TH3 - GL	
11 - ILU TH3 - L1	
12 - ILU TH4 - GL	
13 - ILU TH4 - L1	
14 - ILU TH5 - GL	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	
Kitchen Taps: All	>= 5 Star WELS rating
Bathroom Taps: All	>= 5 Star WELS rating

Dishwashers:	
Main Building	Default or unrated
1 - V2	>= 4 Star WELS rating
2 - UO - Under	
3 - UO - Over	
4 - UO - Under	
5 - UO - Over	
6 - ILU TH1 - GL	
7 - ILU TH1 - L1	
8 - ILU TH2 - GL	
9 - ILU TH2 - L1	
10 - ILU TH3 - GL	
11 - ILU TH3 - L1	
12 - ILU TH4 - GL	
13 - ILU TH4 - L1	
14 - ILU TH5 - GL	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	
WC: All	>= 4 Star WELS rating

Urinals:	
Main Building	>= 6 Star WELS rating
1 - V2	Scope out
2 - UO - Under	
3 - UO - Over	
4 - UO - Under	
5 - UO - Over	
6 - ILU TH1 - GL	
7 - ILU TH1 - L1	
8 - ILU TH2 - GL	
9 - ILU TH2 - L1	
10 - ILU TH3 - GL	
11 - ILU TH3 - L1	
12 - ILU TH4 - GL	
13 - ILU TH4 - L1	
14 - ILU TH5 - GL	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	

Washing Machine Water Efficiency:	
Main Building	>= 6 Star WELS rating
1 - V2 2 - UO - Under 3 - UO - Over 4 - UO - Under 5 - UO - Over 6 - ILU TH1 - GL 7 - ILU TH1 - L1 8 - ILU TH2 - GL 9 - ILU TH2 - L1 10 - ILU TH3 - GL 11 - ILU TH3 - L1 12 - ILU TH4 - GL 13 - ILU TH4 - L1 14 - ILU TH5 - GL 15 - ILU TH5 - L1 16 - ILU TH5 - L2 17 House Lot 1 18 House Lot 2 F.Rd Apt GL NW APT 3 T-B F.Rd Apt L1 N APT 7 T-A 21 R1A 22 R2 23 R1C 24 R2 25 R5 26 R6 Apt Bld 1 G SE cnr APT 5 T-B Apt Bld 1 G NW cnr APT 11 T-C Apt Bld 1 L1 W APT 18 T-B Apt Bld 1 L1 E APT 13 T-A Apt Bld 1 L3 NW cnr APT 38 T-C Apt Bld 1 L3 W APT 36 T-B Apt Bld 1 L3 E APT 31 T-A Apt Bld 1 L3 SW cnr APT 34 T-B Apt Bld 1 L3 NE APT 33 T-D	Occupant to Install
Which non-potable water source is the dwelling/space connected to?: All	1
Non-potable water source connected to Toilets: All	Yes
Non-potable water source connected to Laundry (washing machine): All	No
Non-potable water source connected to Hot Water System: All	No
Rainwater Tank	
What is the total roof area connected to the rainwater tank?: RACF-Laundry	4,060 m²
Tank Size: RACF-Laundry	80,000 Litres
Will this tank be connected to the reticulated third pipe or onsite water recycling system?: RACF-Laundry	No
Irrigation area connected to tank: RACF-Laundry	600 m²

Is connected irrigation area a water efficient garden?: RACF- Laundry	No
Other external water demand connected to tank?: RACF- Laundry	4,000 Litres/Day
1.1 Potable water use reduction	40%
Score Contribution	This credit contributes 71.4% towards the category score.
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.
Output	Reference
Project	100365 kL
Output	Proposed (excluding rainwater and recycled water use)
Project	76924 kL
Output	Proposed (including rainwater and recycled water use)
Project	75111 kL
Output	% Reduction in Potable Water Consumption
Project	25 %
Output	% of connected demand met by rainwater
Project	100 %
Output	How often does the tank overflow?
Project	Very Often
Output	Opportunity for additional rainwater connection
Project	40616 kL
3.1 Water Efficient Landscaping	100%
Score Contribution	This credit contributes 14.3% towards the category score.
Criteria	Will water efficient landscaping be installed?
Question	Criteria Achieved ?
Project	Yes
4.1 Building Systems Water Use Reduction	100%
Score Contribution	This credit contributes 14.3% towards the category score.
Criteria	Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems?
Question	Criteria Achieved ?
Project	Yes

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Energy Overall contribution 16% Minimum required 50%

Use the BESS Deem to Satisfy (DtS) method for Energy?:	No
Dwellings Energy Approach	
What approach do you want to use for Energy?:	Use the built in calculation tools
Project Energy Profile Question	
Are you installing any solar photovoltaic (PV) system(s)?:	Yes
Are you installing any other renewable energy system(s)?:	No
Gas supplied into building:	No gas connection
Dwelling Energy Profiles	
Building:	
1 - V2 2 - UO - Under 3 - UO - Over 4 - UO - Under 5 - UO - Over 6 - ILU TH1 - GL 7 - ILU TH1 - L1 8 - ILU TH2 - GL 9 - ILU TH2 - L1 10 - ILU TH3 - GL 11 - ILU TH3 - L1 12 - ILU TH4 - GL 13 - ILU TH4 - L1 14 - ILU TH5 - GL 15 - ILU TH5 - L1 16 - ILU TH5 - L2	ILUs
17 House Lot 1 18 House Lot 2	House Lots
F.Rd Apt GL NW APT 3 T-B F.Rd Apt L1 N APT 7 T-A	Fletcher Rd Apartments
21 R1A 22 R2 23 R1C 24 R2 25 R5 26 R6	Rowhouses
Apt Bld 1 G SE cnr APT 5 T-B Apt Bld 1 G NW cnr APT 11 T-C Apt Bld 1 L1 W APT 18 T-B Apt Bld 1 L1 E APT 13 T-A Apt Bld 1 L3 NW cnr APT 38 T-C Apt Bld 1 L3 W APT 36 T-B Apt Bld 1 L3 E APT 31 T-A Apt Bld 1 L3 SW cnr APT 34 T-B	Apartment 1
Apt Bld 1 L3 NE APT 33 T-D	Apartment 2

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Below the floor is:	
1 - V2	Ground or Carpark
2 - UO - Under	
4 - UO - Under	
6 - ILU TH1 - GL	
8 - ILU TH2 - GL	
10 - ILU TH3 - GL	
12 - ILU TH4 - GL	
14 - ILU TH5 - GL	
17 House Lot 1	
18 House Lot 2	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
3 - UO - Over	Another Occupancy
5 - UO - Over	
7 - ILU TH1 - L1	
9 - ILU TH2 - L1	
11 - ILU TH3 - L1	
13 - ILU TH4 - L1	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	

Above the ceiling is:	
1 - V2	Outside
3 - UO - Over	
5 - UO - Over	
7 - ILU TH1 - L1	
9 - ILU TH2 - L1	
11 - ILU TH3 - L1	
13 - ILU TH4 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	
2 - UO - Under	Another Occupancy
4 - UO - Under	
6 - ILU TH1 - GL	
8 - ILU TH2 - GL	
10 - ILU TH3 - GL	
12 - ILU TH4 - GL	
14 - ILU TH5 - GL	
15 - ILU TH5 - L1	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	

Exposed sides:	
1 - V2	3
2 - UO - Under	
3 - UO - Over	
4 - UO - Under	
5 - UO - Over	
6 - ILU TH1 - GL	
7 - ILU TH1 - L1	
8 - ILU TH2 - GL	
9 - ILU TH2 - L1	
10 - ILU TH3 - GL	
11 - ILU TH3 - L1	
12 - ILU TH4 - GL	
13 - ILU TH4 - L1	
14 - ILU TH5 - GL	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
22 R2	
23 R1C	
26 R6	
F.Rd Apt L1 N APT 7 T-A	1
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 NE APT 33 T-D	
21 R1A	2
24 R2	
25 R5	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 SW cnr APT 34 T-B	

NatHERS Annual Energy Loads - Heat:	
1 - V2	66.4 MJ/sqm
2 - UO - Under	71.9 MJ/sqm
3 - UO - Over	76.2 MJ/sqm
4 - UO - Under	79.1 MJ/sqm
5 - UO - Over	72.3 MJ/sqm
6 - ILU TH1 - GL	67.0 MJ/sqm
7 - ILU TH1 - L1	74.1 MJ/sqm
8 - ILU TH2 - GL	77.8 MJ/sqm
9 - ILU TH2 - L1	74.6 MJ/sqm
10 - ILU TH3 - GL	81.5 MJ/sqm
11 - ILU TH3 - L1	74.4 MJ/sqm
12 - ILU TH4 - GL	78.3 MJ/sqm
13 - ILU TH4 - L1	69.2 MJ/sqm
14 - ILU TH5 - GL	48.5 MJ/sqm
15 - ILU TH5 - L1	58.7 MJ/sqm
16 - ILU TH5 - L2	73.5 MJ/sqm
17 House Lot 1 18 House Lot 2	82.0 MJ/sqm
F.Rd Apt GL NW APT 3 T-B	70.5 MJ/sqm
F.Rd Apt L1 N APT 7 T-A	49.5 MJ/sqm
21 R1A	75.7 MJ/sqm
22 R2	74.0 MJ/sqm
23 R1C	82.4 MJ/sqm
24 R2	77.9 MJ/sqm
25 R5	74.8 MJ/sqm
26 R6	76.3 MJ/sqm
Apt Bld 1 G SE cnr APT 5 T-B	59.8 MJ/sqm
Apt Bld 1 G NW cnr APT 11 T-C	35.2 MJ/sqm
Apt Bld 1 L1 W APT 18 T-B	18.2 MJ/sqm
Apt Bld 1 L1 E APT 13 T-A	9.4 MJ/sqm
Apt Bld 1 L3 NW cnr APT 38 T-C	66.6 MJ/sqm
Apt Bld 1 L3 W APT 36 T-B	44.5 MJ/sqm
Apt Bld 1 L3 E APT 31 T-A	46.1 MJ/sqm
Apt Bld 1 L3 SW cnr APT 34 T-B	54.9 MJ/sqm
Apt Bld 1 L3 NE APT 33 T-D	64.5 MJ/sqm

NatHERS Annual Energy Loads - Cool:	
1 - V2	12.1 MJ/sqm
2 - UO - Under	12.5 MJ/sqm
3 - UO - Over Apt Bld 1 G NW cnr APT 11 T-C	14.7 MJ/sqm
4 - UO - Under	11.1 MJ/sqm
5 - UO - Over	18.3 MJ/sqm
6 - ILU TH1 - GL	16.1 MJ/sqm
7 - ILU TH1 - L1	16.8 MJ/sqm
8 - ILU TH2 - GL	7.7 MJ/sqm
9 - ILU TH2 - L1	15.9 MJ/sqm
10 - ILU TH3 - GL	9.3 MJ/sqm
11 - ILU TH3 - L1	16.2 MJ/sqm
12 - ILU TH4 - GL	9.1 MJ/sqm
13 - ILU TH4 - L1 17 House Lot 1 18 House Lot 2	21.0 MJ/sqm
14 - ILU TH5 - GL	19.0 MJ/sqm
15 - ILU TH5 - L1 Apt Bld 1 L3 W APT 36 T-B	20.9 MJ/sqm
16 - ILU TH5 - L2	14.1 MJ/sqm
F.Rd Apt GL NW APT 3 T-B	11.3 MJ/sqm
F.Rd Apt L1 N APT 7 T-A	10.3 MJ/sqm
21 R1A	7.4 MJ/sqm
22 R2	14.2 MJ/sqm
23 R1C	8.4 MJ/sqm
24 R2	10.1 MJ/sqm
25 R5	12.9 MJ/sqm
26 R6	13.8 MJ/sqm
Apt Bld 1 G SE cnr APT 5 T-B	6.5 MJ/sqm
Apt Bld 1 L1 W APT 18 T-B	14.3 MJ/sqm
Apt Bld 1 L1 E APT 13 T-A	14.6 MJ/sqm
Apt Bld 1 L3 NW cnr APT 38 T-C Apt Bld 1 L3 SW cnr APT 34 T-B	19.3 MJ/sqm
Apt Bld 1 L3 E APT 31 T-A	18.5 MJ/sqm
Apt Bld 1 L3 NE APT 33 T-D	12.7 MJ/sqm

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NatHERS star rating:	
1 - V2 15 - ILU TH5 - L1 Apt Bld 1 L3 NE APT 33 T-D	7.4
2 - UO - Under 6 - ILU TH1 - GL 8 - ILU TH2 - GL 21 R1A Apt Bld 1 L3 NW cnr APT 38 T-C	7.2
3 - UO - Over 4 - UO - Under 5 - UO - Over 7 - ILU TH1 - L1 9 - ILU TH2 - L1 10 - ILU TH3 - GL 11 - ILU TH3 - L1 13 - ILU TH4 - L1 17 House Lot 1 18 House Lot 2 23 R1C 26 R6	7.0
12 - ILU TH4 - GL 16 - ILU TH5 - L2 22 R2 24 R2 25 R5	7.1
14 - ILU TH5 - GL	7.7
F.Rd Apt GL NW APT 3 T-B	7.3
F.Rd Apt L1 N APT 7 T-A	7.9
Apt Bld 1 G SE cnr APT 5 T-B Apt Bld 1 L3 W APT 36 T-B Apt Bld 1 L3 E APT 31 T-A	7.8
Apt Bld 1 G NW cnr APT 11 T-C	8.3
Apt Bld 1 L1 W APT 18 T-B	8.8
Apt Bld 1 L1 E APT 13 T-A	9.1
Apt Bld 1 L3 SW cnr APT 34 T-B	7.5
Type of Heating System: All	D Reverse cycle space
Heating System Efficiency: All	3 Star
Type of Cooling System: All	Refrigerative space
Cooling System Efficiency: All	3 Stars
Type of Hot Water System: All	B Electric Instantaneous
% Contribution from solar hot water system: All	0 %
Is the hot water system shared by multiple dwellings?: All	No

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Clothes Line:	
1 - V2	D Private outdoor clothesline
2 - UO - Under	
4 - UO - Under	
6 - ILU TH1 - GL	
8 - ILU TH2 - GL	
10 - ILU TH3 - GL	
11 - ILU TH3 - L1	
12 - ILU TH4 - GL	
14 - ILU TH5 - GL	
3 - UO - Over	A No drying facilities
5 - UO - Over	
7 - ILU TH1 - L1	
9 - ILU TH2 - L1	
13 - ILU TH4 - L1	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	

Clothes Dryer:	
1 - V2	A No clothes dryer
2 - UO - Under	
4 - UO - Under	
6 - ILU TH1 - GL	
8 - ILU TH2 - GL	
10 - ILU TH3 - GL	
12 - ILU TH4 - GL	
14 - ILU TH5 - GL	
3 - UO - Over	Occupant to Install
5 - UO - Over	
7 - ILU TH1 - L1	
9 - ILU TH2 - L1	
11 - ILU TH3 - L1	
13 - ILU TH4 - L1	
15 - ILU TH5 - L1	
16 - ILU TH5 - L2	
17 House Lot 1	
18 House Lot 2	
F.Rd Apt GL NW APT 3 T-B	
F.Rd Apt L1 N APT 7 T-A	
21 R1A	
22 R2	
23 R1C	
24 R2	
25 R5	
26 R6	
Apt Bld 1 G SE cnr APT 5 T-B	
Apt Bld 1 G NW cnr APT 11 T-C	
Apt Bld 1 L1 W APT 18 T-B	
Apt Bld 1 L1 E APT 13 T-A	
Apt Bld 1 L3 NW cnr APT 38 T-C	
Apt Bld 1 L3 W APT 36 T-B	
Apt Bld 1 L3 E APT 31 T-A	
Apt Bld 1 L3 SW cnr APT 34 T-B	
Apt Bld 1 L3 NE APT 33 T-D	

Non-Residential Building Energy Profile	
Heating, Cooling & Comfort Ventilation - Electricity - reference fabric and reference services:	1,910,103 kWh
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and reference services:	1,910,103 kWh
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and proposed services:	1,910,103 kWh
Heating - Wood - reference fabric and reference services:	-
Heating - Wood - proposed fabric and reference services:	-
Heating - Wood - proposed fabric and proposed services:	-
Hot Water - Electricity - Baseline:	36,732 kWh
Hot Water - Electricity - Proposed:	36,732 kWh
Lighting - Baseline:	734,655 kWh
Lighting - Proposed:	734,655 kWh

Peak Thermal Cooling Load - Baseline:	-
Peak Thermal Cooling Load - Proposed:	-
Solar Photovoltaic system	
System Size (lesser of inverter and panel capacity): Main Building	60.0 kW peak
Orientation (which way is the system facing)?: Main Building	North
Inclination (angle from horizontal): Main Building	30.0 Angle (degrees)
Which Building Class does this apply to?: Main Building	Public building

1.1 Thermal Performance Rating - Non-Residential	12%
Score Contribution	This credit contributes 8.8% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?
Annotation	Estimated based on 'Baseline Energy Consumption and Greenhouse Gas Emissions in Commercial Buildings in Australia', November 2012. Average hotel energy consumption of 1462MJ/m2, split into energy end uses as per Figure 5.9 ('Office Base Buildings Electricity End Use Shares') of the same document (in lieu of a specific breakdown for aged care tenancies). Main Building 9,045m2 = 13,223,790MJ = 3,673,275kWh 52% to HVAC 20% to lighting 1% to DHW

1.2 Thermal Performance Rating - Residential	50%
Score Contribution	This credit contributes 27.7% towards the category score.
Criteria	What is the average NatHERS rating?
Output	Average NATHERS Rating (Weighted)
Detached dwelling	7.1 Stars
Townhouse	7.1 Stars
Apartment	7.4 Stars

2.1 Greenhouse Gas Emissions	100%
Score Contribution	This credit contributes 11.5% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?
Output	Reference Building with Reference Services (BCA only)
Detached dwelling	218,367 kg CO2
Townhouse	699,977 kg CO2
Apartment	2,055,864 kg CO2
Public building	1,985,772 kg CO2
Output	Proposed Building with Proposed Services (Actual Building)
Detached dwelling	94,735 kg CO2
Townhouse	290,890 kg CO2
Apartment	825,795 kg CO2
Public building	1,985,772 kg CO2
Output	% Reduction in GHG Emissions
Detached dwelling	56 %
Townhouse	58 %
Apartment	59 %
Public building	0 %
2.2 Peak Demand	0%
Score Contribution	This credit contributes 5.7% towards the category score.
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?
Output	Peak Thermal Cooling Load - Baseline
Detached dwelling	436 kW
Townhouse	805 kW
Apartment	3,564 kW
Output	Peak Thermal Cooling Load - Proposed
Detached dwelling	373 kW
Townhouse	768 kW
Apartment	3,197 kW
Output	Peak Thermal Cooling Load - % Reduction
Detached dwelling	14 %
Townhouse	4 %
Apartment	10 %

2.3 Electricity Consumption		100%	
Score Contribution	This credit contributes 11.5% towards the category score.		
Criteria	What is the % reduction in annual electricity consumption against the benchmark?		
Output	Reference		
Detached dwelling	214,085 kWh		
Townhouse	686,252 kWh		
Apartment	2,015,553 kWh		
Public building	1,946,835 kWh		
Output	Proposed		
Detached dwelling	92,877 kWh		
Townhouse	285,186 kWh		
Apartment	809,603 kWh		
Public building	1,946,835 kWh		
Output	Improvement		
Detached dwelling	56 %		
Townhouse	58 %		
Apartment	59 %		
Public building	0 %		
2.4 Gas Consumption		N/A	Scoped Out
This credit was scoped out	No gas connection in use		
2.5 Wood Consumption		N/A	Scoped Out
This credit was scoped out	No wood heating system present		
3.1 Carpark Ventilation		N/A	Scoped Out
This credit was scoped out	49 spaces.		

3.2 Hot Water		100%
Score Contribution	This credit contributes 5.7% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?	
Output	Reference	
Detached dwelling	82,371 kWh	
Townhouse	232,798 kWh	
Apartment	795,781 kWh	
Public building	36,732 kWh	
Output	Proposed	
Detached dwelling	48,753 kWh	
Townhouse	142,657 kWh	
Apartment	452,777 kWh	
Public building	36,732 kWh	
Output	Improvement	
Detached dwelling	40 %	
Townhouse	38 %	
Apartment	43 %	
Public building	0 %	
3.3 External Lighting		100%
Score Contribution	This credit contributes 1.6% towards the category score.	
Criteria	Is the external lighting controlled by a motion detector?	
Question	Criteria Achieved ?	
Detached dwelling	Yes	
Townhouse	Yes	
3.4 Clothes Drying		74%
Score Contribution	This credit contributes 4.6% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) from a combination of clothes lines and efficient driers against the benchmark?	
Output	Reference	
Detached dwelling	15,008 kWh	
Townhouse	43,272 kWh	
Apartment	141,831 kWh	
Output	Proposed	
Detached dwelling	12,655 kWh	
Townhouse	43,272 kWh	
Apartment	103,220 kWh	
Output	Improvement	
Detached dwelling	15 %	
Townhouse	0 %	
Apartment	27 %	

3.5 Internal Lighting - Residential Single Dwelling		100%	
Score Contribution	This credit contributes 1.6% towards the category score.		
Criteria	Does the development achieve a maximum illumination power density of 4W/sqm or less?		
Question	Criteria Achieved?		
Detached dwelling	Yes		
Townhouse	Yes		
3.6 Internal Lighting - Residential Multiple Dwellings		100%	
Score Contribution	This credit contributes 6.1% towards the category score.		
Criteria	Is the maximum illumination power density (W/m2) in at least 90% of the relevant building class at least 20% lower than required by Table J6.2a of the NCC 2019 Vol 1 (Class 2-9) and Clause 3.12.5.5 NCC 2019 Vol 2 (Class 1 & 10)?		
Question	Criteria Achieved ?		
Apartment	Yes		
3.7 Internal Lighting - Non-Residential		100%	
Score Contribution	This credit contributes 2.2% towards the category score.		
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J6.2a of the NCC 2019 Vol 1?		
Question	Criteria Achieved ?		
Public building	Yes		
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	◇ Scoped Out
This credit was scoped out	No cogeneration or trigeneration system in use.		
4.2 Renewable Energy Systems - Solar		0%	
Score Contribution	This credit contributes 4.2% towards the category score.		
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?		
Output	Solar Power - Energy Generation per year		
Public building	78,183 kWh		
Output	% of Building's Energy		
Public building	2 %		
4.4 Renewable Energy Systems - Other		N/A	⊘ Disabled
This credit is disabled	No other (non-solar PV) renewable energy is in use.		
4.5 Solar PV - Houses and Townhouses		0%	
Score Contribution	This credit contributes 3.1% towards the category score.		
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?		

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Stormwater

Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?:	MUSIC or other modelling software
1.1 Stormwater Treatment	100%
Score Contribution	This credit contributes 100.0% towards the category score.
Criteria	Has best practice stormwater management been demonstrated?
Question	Flow (ML/year)
Project	3.0 % Reduction
Question	Total Suspended Solids (kg/year)
Project	85.8 % Reduction
Question	Total Phosphorus (kg/year)
Project	63.7 % Reduction
Question	Total Nitrogen (kg/year)
Project	45.2 % Reduction

IEQ Overall contribution 8% Minimum required 50%

IEQ DTS	
Use the BESS Deemed to Satisfy (DtS) method for IEQ?:	No
Dwellings IEQ Approach	
What approach do you want to use for dwellings?:	Use the built in calculation tools
Dwelling Daylight Room Profile Questions	
Room Designation:	
Under Overs - Edge condition Under Overs - No edge condition - Lower Under Overs - No edge condition - Upper Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5 Townhouses - TH3 - Lower Fletcher Apt. - B, LG, & G NW corner Apt. Fletcher Apt. - G & FF central Apts. and G NE corner Apt. Fletcher Apt. - FF NE corner Apt Apt. B1 - 1 & 2 Bed - E Apt. B1 - GF - 2 Bed - SE Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W Apt. B1 - GF, L1, L2, & L3 - 3 Bed Apt. B2 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - W Apt. B2 - 2 Bed - SE Apt. B2 - 3 Bed	Living
Townhouses - TH1, TH2, TH3, TH4, & TH5 Fletcher Apt. - B, LG, G, & FF Under Overs Apt. B1 - GF - 2 Bed - SE Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 1, 2, & 3 Bed	Bedroom

Quantity:	
Under Overs - Edge condition	44
Under Overs - No edge condition - Lower Under Overs - No edge condition - Upper Fletcher Apt. - B, LG, G, & FF	19
Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5	92
Townhouses - TH3 - Lower	4
Townhouses - TH1, TH2, TH3, TH4, & TH5	230
Fletcher Apt. - B, LG, & G NW corner Apt. Apt. B2 - 2 Bed - SE	3
Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	5
Fletcher Apt. - FF NE corner Apt Apt. B1 - GF - 2 Bed - SE Apt. B1 - GF - 2 Bed - SE	1
Under Overs	164
Apt. B1 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - W	12
Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W	16
Apt. B1 - GF, L1, L2, & L3 - 3 Bed	9
Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 1, 2, & 3 Bed	88
Apt. B2 - 3 Bed	14

Auto-Pass:	Yes
Under Overs - Edge condition	
Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5	
Townhouses - TH1, TH2, TH3, TH4, & TH5	
Fletcher Apt. - FF NE corner Apt	
Fletcher Apt. - B, LG, G, & FF	
Under Overs	
Apt. B1 - GF, L1, L2 & L3	

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Room Floor Area:	
Under Overs - Edge condition Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5 Townhouses - TH1, TH2, TH3, TH4, & TH5 Fletcher Apt. - FF NE corner Apt Fletcher Apt. - B, LG, G, & FF Under Overs Apt. B1 - GF, L1, L2, & L3 - 3 Bed Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 2 Bed - SE Apt. B2 - 3 Bed Apt. B2 - 1, 2, & 3 Bed	-
Under Overs - No edge condition - Lower	33.9 m^2
Under Overs - No edge condition - Upper	33.4 m^2
Townhouses - TH3 - Lower	33.7 m^2
Fletcher Apt. - B, LG, & G NW corner Apt.	40.1 m^2
Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	35.4 m^2
Apt. B1 - 1 & 2 Bed - E Apt. B1 - GF - 2 Bed - SE Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W Apt. B2 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - W	33.2 m^2
Apt. B1 - GF - 2 Bed - SE	17.9 m^2
Vertical Angle:	
Under Overs - Edge condition Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5 Townhouses - TH1, TH2, TH3, TH4, & TH5 Fletcher Apt. - FF NE corner Apt Fletcher Apt. - B, LG, G, & FF Under Overs Apt. B1 - GF, L1, L2, & L3 - 3 Bed Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 2 Bed - SE Apt. B2 - 3 Bed Apt. B2 - 1, 2, & 3 Bed	-
Under Overs - No edge condition - Lower	36.3 Angle (degrees)
Under Overs - No edge condition - Upper	38.7 Angle (degrees)
Townhouses - TH3 - Lower Apt. B1 - GF - 2 Bed - SE Apt. B1 - GF - 2 Bed - SE	90.0 Angle (degrees)
Fletcher Apt. - B, LG, & G NW corner Apt.	31.5 Angle (degrees)
Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	34.4 Angle (degrees)
Apt. B1 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - E	34.0 Angle (degrees)
Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W Apt. B2 - 1 & 2 Bed - W	36.9 Angle (degrees)

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Horizontal Angle:	
Under Overs - Edge condition Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5 Townhouses - TH1, TH2, TH3, TH4, & TH5 Fletcher Apt. - FF NE corner Apt Fletcher Apt. - B, LG, G, & FF Under Overs Apt. B1 - GF, L1, L2, & L3 - 3 Bed Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 2 Bed - SE Apt. B2 - 3 Bed Apt. B2 - 1, 2, & 3 Bed	-
Under Overs - No edge condition - Lower	92.3 Angle (degrees)
Under Overs - No edge condition - Upper	96.9 Angle (degrees)
Townhouses - TH3 - Lower Apt. B1 - GF - 2 Bed - SE	180 Angle (degrees)
Fletcher Apt. - B, LG, & G NW corner Apt.	122 Angle (degrees)
Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	99.0 Angle (degrees)
Apt. B1 - 1 & 2 Bed - E	75.1 Angle (degrees)
Apt. B1 - GF - 2 Bed - SE	152 Angle (degrees)
Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W	111 Angle (degrees)
Apt. B2 - 1 & 2 Bed - E	72.0 Angle (degrees)
Apt. B2 - 1 & 2 Bed - W	93.0 Angle (degrees)
Window Area:	
Under Overs - Edge condition Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5 Townhouses - TH1, TH2, TH3, TH4, & TH5 Fletcher Apt. - FF NE corner Apt Fletcher Apt. - B, LG, G, & FF Under Overs Apt. B1 - GF, L1, L2, & L3 - 3 Bed Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 2 Bed - SE Apt. B2 - 3 Bed Apt. B2 - 1, 2, & 3 Bed	-
Under Overs - No edge condition - Lower	4.7 m^2
Under Overs - No edge condition - Upper	7.6 m^2
Townhouses - TH3 - Lower	6.6 m^2
Fletcher Apt. - B, LG, & G NW corner Apt.	12.1 m^2
Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	9.1 m^2
Apt. B1 - 1 & 2 Bed - E Apt. B1 - GF - 2 Bed - SE Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W Apt. B2 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - W	8.1 m^2
Apt. B1 - GF - 2 Bed - SE	2.4 m^2

Window Orientation:	
Under Overs - Edge condition Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5 Townhouses - TH1, TH2, TH3, TH4, & TH5 Fletcher Apt. - FF NE corner Apt Fletcher Apt. - B, LG, G, & FF Under Overs Apt. B1 - GF, L1, L2, & L3 - 3 Bed Apt. B1 - All Apts. except GF 2 Bed in SE corner Apt. B2 - 2 Bed - SE Apt. B2 - 3 Bed Apt. B2 - 1, 2, & 3 Bed	-
Under Overs - No edge condition - Lower Under Overs - No edge condition - Upper Townhouses - TH3 - Lower Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W Apt. B2 - 1 & 2 Bed - W	West
Fletcher Apt. - B, LG, & G NW corner Apt. Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	North
Apt. B1 - 1 & 2 Bed - E Apt. B2 - 1 & 2 Bed - E	East
Apt. B1 - GF - 2 Bed - SE Apt. B1 - GF - 2 Bed - SE	South

Glass Type:	
Under Overs - Edge condition	
Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5	
Townhouses - TH1, TH2, TH3, TH4, & TH5	
Fletcher Apt. - FF NE corner Apt	
Fletcher Apt. - B, LG, G, & FF	
Under Overs	
Apt. B1 - GF, L1, L2 & L3	

Daylight Criteria Achieved?:		
Under Overs - Edge condition	Yes	
Under Overs - No edge condition - Upper		
Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5		
Townhouses - TH3 - Lower		
Townhouses - TH1, TH2, TH3, TH4, & TH5		
Fletcher Apt. - B, LG, & G NW corner Apt.		
Fletcher Apt. - G & FF central Apts. and G NE corner Apt.		
Fletcher Apt. - FF NE corner Apt		
Fletcher Apt. - B, LG, G, & FF		
Under Overs		
Apt. B1 - 1 & 2 Bed - E		
Apt. B1 - GF - 2 Bed - SE		
Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W		
Apt. B1 - GF, L1, L2, & L3 - 3 Bed		
Apt. B1 - GF - 2 Bed - SE		
Apt. B1 - All Apts. except GF 2 Bed in SE corner		
Apt. B2 - 1 & 2 Bed - W		
Apt. B2 - 2 Bed - SE		
Apt. B2 - 3 Bed		
Apt. B2 - 1, 2, & 3 Bed		
Under Overs - No edge condition - Lower	No	
Apt. B2 - 1 & 2 Bed - E		

1.1 Daylight Access - Living Areas		66%	
Score Contribution	This credit contributes 14.2% towards the category score.		
Criteria	What % of living areas achieve a daylight factor greater than 1%		
Output	Calculated percentage		
Apartment	88 %		

1.2 Daylight Access - Bedrooms		100%	
Score Contribution	This credit contributes 14.2% towards the category score.		
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%		
Output	Calculated percentage		
Apartment	100 %		

1.3 Winter Sunlight		0%	
Score Contribution	This credit contributes 4.7% towards the category score.		
Criteria	Do 70% of dwellings receive at least 3 hours of direct sunlight in all Living areas between 9am and 3pm in mid-winter?		
Question	Criteria Achieved ?		
Apartment	No		

1.4 Daylight Access - Non-Residential		40%	✔ Achieved
Score Contribution	This credit contributes 10.2% towards the category score.		
Criteria	What % of the nominated floor area has at least 2% daylight factor?		
Question	Percentage Achieved?		
Public building	40 %		

1.5 Daylight Access - Minimal Internal Bedrooms		100%	
Score Contribution	This credit contributes 4.7% towards the category score.		
Criteria	Do at least 90% of dwellings have an external window in all bedrooms?		
Question	Criteria Achieved ?		
Apartment	Yes		
2.1 Effective Natural Ventilation		0%	
Score Contribution	This credit contributes 14.2% towards the category score.		
Criteria	What % of dwellings are effectively naturally ventilated?		
Question	Percentage Achieved?		
Apartment	25 %		
2.2 Cross Flow Ventilation		0%	
Score Contribution	This credit contributes 2.4% towards the category score.		
Criteria	Are all habitable rooms designed to achieve natural cross flow ventilation?		
Question	Criteria Achieved ?		
Detached dwelling	No		
Townhouse	No		
2.3 Ventilation - Non-Residential		43%	✔ Achieved
Score Contribution	This credit contributes 10.2% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Public building	0 %		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?		
Question	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668:2012?		
Public building	80 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Public building	0 ppm		
3.1 Thermal comfort - Double Glazing		100%	
Score Contribution	This credit contributes 4.8% towards the category score.		
Criteria	Is double glazing (or better) used to all habitable areas?		
Question	Criteria Achieved ?		
Detached dwelling	Yes		
Townhouse	Yes		

3.2 Thermal Comfort - External Shading		0%
Score Contribution	This credit contributes 2.4% towards the category score.	
Criteria	Is appropriate external shading provided to east, west and north facing glazing?	
Question	Criteria Achieved ?	
Detached dwelling	No	
Townhouse	No	
3.3 Thermal Comfort - Orientation		0%
Score Contribution	This credit contributes 2.4% towards the category score.	
Criteria	Are at least 50% of living areas orientated to the north?	
Question	Criteria Achieved ?	
Detached dwelling	No	
Townhouse	No	
3.4 Thermal comfort - Shading - Non-residential		0%
Score Contribution	This credit contributes 5.1% towards the category score.	
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?	
Question	Percentage Achieved?	
Public building	0 %	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%
Score Contribution	This credit contributes 1.7% towards the category score.	
Criteria	What percentage of regular use areas in tenancies have ceiling fans?	
Question	Percentage Achieved?	
Public building	24 %	
4.1 Air Quality - Non-Residential		100%
Score Contribution	This credit contributes 8.8% towards the category score.	
Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?	
Question	Criteria Achieved ?	
Project	Yes	
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?	
Question	Criteria Achieved ?	
Project	Yes	
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?	
Question	Criteria Achieved ?	
Project	Yes	

Transport Overall contribution 2%

1.1 Bicycle Parking - Residential		0%	
Score Contribution	This credit contributes 16.6% towards the category score.		
Criteria	How many secure and undercover bicycle spaces are there per dwelling for residents?		
Question	Bicycle Spaces Provided ?		
Detached dwelling	-		
Townhouse	0		
Apartment	18		
Output	Min Bicycle Spaces Required		
Apartment	266		
1.2 Bicycle Parking - Residential Visitor		0%	
Score Contribution	This credit contributes 15.9% towards the category score.		
Criteria	How many secure bicycle spaces are there per 5 dwellings for visitors?		
Question	Visitor Bicycle Spaces Provided ?		
Townhouse	0		
Apartment	9		
Output	Min Visitor Bicycle Spaces Required		
Apartment	54		
1.3 Bicycle Parking - Convenience Residential		N/A	⊘ Disabled
This credit is disabled	Credit 1.1 must be achieved first.		
1.4 Bicycle Parking - Non-Residential		0%	
Score Contribution	This credit contributes 4.1% towards the category score.		
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?		
Question	Criteria Achieved ?		
Public building	No		
Question	Bicycle Spaces Provided ?		
Public building	0		
1.5 Bicycle Parking - Non-Residential Visitor		0%	
Score Contribution	This credit contributes 2.1% towards the category score.		
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?		
Question	Criteria Achieved ?		
Public building	No		
Question	Bicycle Spaces Provided ?		
Public building	0		
1.6 End of Trip Facilities - Non-Residential		N/A	⊘ Disabled
This credit is disabled	Credit 1.4 must be complete first.		

2.1 Electric Vehicle Infrastructure		100%
Score Contribution	This credit contributes 21.4% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Annotation	2 spaces within the Main Building basement	
Question	Criteria Achieved ?	
Project	Yes	
2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 10.7% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	
2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 21.4% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	No	

Waste Overall contribution 6%

1.1 - Construction Waste - Building Re-Use		N/A	Scoped Out
This credit was scoped out	Undeveloped site.		
2.1 - Operational Waste - Food & Garden Waste		100%	
Score Contribution	This credit contributes 50.0% towards the category score.		
Criteria	Are facilities provided for on-site management of food and garden waste?		
Question	Criteria Achieved ?		
Project	Yes		
2.2 - Operational Waste - Convenience of Recycling		100%	
Score Contribution	This credit contributes 50.0% towards the category score.		
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?		
Question	Criteria Achieved ?		
Project	Yes		

Urban Ecology Overall contribution 3%

1.1 Communal Spaces		26%
Score Contribution	This credit contributes 8.6% towards the category score.	
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?	
Annotation	Lounge 154sqm, 2 x TV lounges each 40sqm, libraries 40 + 40 + 60	
Question	Common space provided	
Apartment	-	
Public building	374 m²	
Output	Minimum Common Space Required	
Apartment	289 m²	
Public building	363 m²	
2.1 Vegetation		100%
Score Contribution	This credit contributes 47.2% towards the category score.	
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?	
Question	Percentage Achieved ?	
Project	31 %	
2.2 Green Roofs		0%
Score Contribution	This credit contributes 11.8% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	
2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 11.8% towards the category score.	
Criteria	Does the development incorporate a green wall or green façade?	
Question	Criteria Achieved ?	
Project	No	
2.4 Private Open Space - Balcony / Courtyard Ecology		0%
Score Contribution	This credit contributes 8.8% towards the category score.	
Criteria	Is there a tap and floor waste on every balcony / in every courtyard?	
Question	Criteria Achieved ?	
Townhouse	No	
Apartment	No	

3.1 Food Production - Residential		0%
Score Contribution	This credit contributes 9.5% towards the category score.	
Criteria	What area of space per resident is dedicated to food production?	
Question	Food Production Area	
Detached dwelling	0.0 m²	
Townhouse	0.0 m²	
Apartment	0.0 m²	
Output	Min Food Production Area	
Detached dwelling	17 m²	
Townhouse	49 m²	
Apartment	153 m²	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 2.3% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Public building	0.0 m²	
Output	Min Food Production Area	
Public building	227 m²	

Innovation Overall contribution 5%

Innovations	
Description:	
Community Resilience	A Community Resilience Plan is to be developed prior to the occupation of any habitable building within the community, addressing preparation, during- and post-disaster communication, safety, and response.
Community Users' Guide	A Community Users' Guide is to be prepared, made publicly available and provided to all residents/employees. The guide must include relevant non-technical information pertaining to the sustainability attributes of the project, outlining what is available to project occupants and what they can do to support the design.
High Quality Staff Support	High quality staff support will be put in place for site workers to promote mental and physical health outcomes and knowledge on sustainable practices.
Healthy and Active Living – Footpaths	Footpaths throughout the community are to be provided in accordance with AMCORD for pedestrian facilities, with streets designed for the safe and convenient movement of pedestrians, with consideration to people with disabilities and the elderly.
Community Development Plan	A publicly available community development plan is to be developed for the project and to be implemented
Biophilic Design	Plants, water features, sculptures and fountains spread throughout the community, could prove beneficial to those residents who require sensory stimulation and/or positive mental engagement.
Points Targeted:	
Community Resilience	1
Community Users' Guide	1
High Quality Staff Support	1
Healthy and Active Living – Footpaths	1
Community Development Plan	1
Biophilic Design	1

1.1 Innovation		60%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?	

Appendix 2 – FirstRate5 Assessment Results, Assumptions & Recommendations

The FirstRate5 energy rating program is the primary modelling method used in Victoria to indicate the required energy for heating and cooling based on a building's thermal envelope. It does not take into account any heating or cooling systems installed; it only assesses walls, roof and floor materials, insulation, building orientation, glazing and the area layout.

275 Manchester Road, Chirnside Park is located in Climate Zone 62 (Moorabbin) and is required by the 2019 Building Code of Australia (BCA) to achieve the following minimum energy performance targets:

Class 1 Villas with Concrete Slab on Ground (CSOG) living areas must each achieve a minimum energy rating of 6.0 Star (125MJ/m^2). Further, to comply with BESS Energy, each dwelling is targeting a minimum energy rating of 7.0 Star (91MJ/m^2). The following BCA 2019 heating and cooling load limits apply to each individual dwelling:

- Heating load limit of 115MJ/m^2
- Cooling load limit of 24MJ/m^2

Class 1 Rowhouses with suspended floor living areas must each achieve a minimum energy rating of 6.0 Star (125MJ/m^2). Further, to comply with BESS Energy, each dwelling is targeting a minimum energy rating of 7.0 Star (91MJ/m^2). The following BCA 2019 heating and cooling load limits apply to each individual dwelling:

- Heating load limit of 109MJ/m^2
- Cooling load limit of 34MJ/m^2

Class 1 House Lots have not yet been designed but will need to comply with either the Villa or Rowhouse requirements above, depending on whether the lowest living area is at Ground Level or Level 1.

Class 2 Under & Overs and ILU Townhouses must each achieve a minimum energy rating of 5.0 Star (165MJ/m^2) and collectively achieve an average energy rating of no less than 6.0 Star (138MJ/m^2). Further, to comply with BESS Energy, each dwelling is targeting a minimum energy rating of 7.0 Star (91MJ/m^2). The following BCA 2019 heating and cooling load limits apply to each individual dwelling:

- Heating load limit of 147MJ/m^2 (109 MJ/m^2 Class 2 average limit)
- Cooling load limit of 37MJ/m^2 (26 MJ/m^2 Class 2 average limit).

Further, to meet the requirements of Clause 55.07 Table B4 of the Victorian Planning Provisions, each Under & Over and ILU Townhouse must achieve a cooling load of maximum 21MJ/m^2.

Class 2 Apartments must each achieve a minimum energy rating of 5.0 Star (165MJ/m^2) and collectively achieve an average energy rating of no less than 6.0 Star (125MJ/m^2). Further, to comply with BESS Energy, a minimum average energy rating of 7.0 Star (91MJ/m^2) is being targeted across all apartments. The following BCA 2019 heating and cooling load limits apply to each individual dwelling:

- Heating load limit of 147MJ/m^2 (109 MJ/m^2 Class 2 average limit)
- Cooling load limit of 37MJ/m^2 (26 MJ/m^2 Class 2 average limit).

Further, to meet the requirements of Clause 55.07 Table B4 of the Victorian Planning Provisions, each apartment must achieve a cooling load of maximum 21MJ/m^2.

Table 2: Thermal groups and justification

Sample Dwelling	Thermally Similar	Justification	Star Rating
1 V2	V1, remaining V2	Similar design, same orientation	7.4
2 UO - Under	Half of UO Unders	Same design, same orientation	7.2
3 UO - Over	Half of UO Overs	Same design, same orientation	7.0
4 UO - Under	Half of UO Unders	Same design, same orientation	7.0
5 UO - Over	Half of UO Overs	Same design, same orientation	7.0
6 ILU TH1 - GL	Remaining GL TH1	Same design	7.2
7 ILU TH1 - L1	Remaining L1 TH1	Same design	7.0
8 ILU TH2 - GL	Remaining GL TH2	Same design, same orientation	7.1
9 ILU TH2 - L1	Remaining L1 TH2	Same design, same orientation	7.0
10 ILU TH3 - GL	Remaining GL TH3	Same design, same orientation	7.4
11 ILU TH3 - L1	Remaining L1 TH3	Same design, same orientation	7.0
12 ILU TH4 - GL	Remaining GL TH4	Same design, same orientation	7.1
13 ILU TH4 - L1	Remaining L1 TH4	Same design, same orientation	7.0
14 ILU TH5 - GL	Remaining GL TH5	Same design, same orientation	7.7
15 ILU TH5 - L1	Remaining L1 TH5	Same design, same orientation	7.4
16 ILU TH5 - L2	Remaining L2 TH5	Same design, same orientation	7.1
17 House Lot 1	Half of House Lots	No designs prepared as yet; however it is assumed that they can be grouped	7.0
18 House Lot 2	Half of House Lots	No designs prepared as yet; however it is assumed that they can be grouped	7.0
Fletcher Rd GL NW APT 3 T-B	Remaining NW-facing Fletcher Rd Apts	Same design, same orientation	7.3
Fletcher Rd L1 N APT 7 T-A	Remaining N-facing 2-bed Fletcher Rd Apts	Same design, same orientation	7.9
21 R1A	Half of R1	Split 50/50	7.2
22 R2	Half of R2	Split 50/50	7.1
23 R1C	Half of R1	Split 50/50	7.0
24 R2	Half of R2	Split 50/50	7.1
25 R5	Remaining R5	Same design, same orientation	7.1
26 R6	Remaining R6	Same design, same orientation	7.0
Apt Bld 1 GL SE corner	All SE-facing Apts	All facing SE	7.8

Sample Dwelling	Thermally Similar	Justification	Star Rating
APT 5 T-B			
Apt Bld 1 GL NW corner APT 11 T-C	Half of NW-facing Apts	All facing NW and 3-bed	8.1
Apt Bld 1 L1 W APT 18 T-B	Half of W-facing Apts	All facing W	8.8
Apt Bld 1 L1 E APT 13 T-A	Half of E-facing Apts	All facing E	9.1
Apt Bld 1 L3 NW corner APT 38 T-C	Half of NW-facing Apts	All facing NW and 3-bed	7.2
Apt Bld 1 L3 W APT 36 T-B	Half of W-facing Apts	All facing W	7.8
Apt Bld 1 L3 E APT 31 T-A	Half of E-facing Apts	All facing E	7.8
Apt Bld 1 L3 SW corner APT 34 T-B	All SW-facing Apts	All facing SW	7.5
Apt Bld 2 L3 NE APT 33 T-D	All NE-facing Apts	All facing NE and 3-bed	7.4
Weighted Average	-	-	**7.3**

Table 3: Scores achieved by the dwellings

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Floor Area (m²)	Required Glazing Suite (A/B/C/D)
1 V2	7.4	78.5	66.4	12.1	77.1	A
2 UO - Under	7.2	84.4	71.9	12.5	69.2	B
3 UO - Over	7.0	90.9	76.2	14.7	68.6	D
4 UO - Under	7.0	90.2	79.1	11.1	63.3	C
5 UO - Over	7.0	90.6	72.3	18.3	68.6	C
6 ILU TH1 - GL	7.2	83.1	67.0	16.1	88.4	B
7 ILU TH1 - L1	7.0	90.6	72.2	18.4	88.2	C (north, east south-facing) & D (west-facing)

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Floor Area (m²)	Required Glazing Suite (A/B/C/D)
8 ILU TH2 - GL	7.1	88.0	78.5	9.5	83.7	C
9 ILU TH2 - L1	7.0	90.0	72.7	17.3	90.0	C
10 ILU TH3 - GL	7.4	79,2	67.9	11.3	80.4	C
11 ILU TH3 - L1	7.0	90.5	72.5	18.0	84.7	B
12 ILU TH4 - GL	7.1	87.4	78.3	9.1	88.3	B
13 ILU TH4 - L1	7.0	90.2	69.2	21.0	95.8	C
14 ILU TH5 - GL	7.7	88.6	48.5	19.0	71.1	B
15 ILU TH5 - L1	7.4	79.6	58.7	20.9	89.5	B
16 ILU TH5 - L2	7.1	87.6	73.5	14.1	98.5	D
*17 House Lot 1	7.0	103.0	82.0	21.0	118	TBC
*18 House Lot 2	7.0	103.0	82.0	21.0	118	TBC
Fletcher Rd GL NW APT 3 T-B	7.3	81.8	70.5	11.3	80.4	A
Fletcher Rd L1 N APT 7 T-A	7.9	59.8	49.5	10.3	72.7	A
21 R1A	7.2	83.1	75.7	7.4	96.8	B
22 R2	7.1	88.2	74.0	14.2	112.0	B
23 R1C	7.0	90.8	82.4	8.4	96.8	B
24 R2	7.1	88.0	77.9	10.1	112.0	B
25 R5	7.1	87.7	74.8	12.9	104.3	B
26 R6	7.0	91.0	75.0	16.0	115.9	C
Apt Bld 1 GL SE corner APT 5 T-B	7.8	66.3	59.8	6.5	74.6	A
Apt Bld 1 L1 W APT 11 T-C	8.3	49.9	35.2	14.7	94.5	A
Apt Bld 1 L1 W APT 18 T-B	8.8	32.5	18.2	14.3	69.2	A
Apt Bld 1 L1 E APT 13 T-A	9.1	24.0	9.4	14.6	51.7	A

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Floor Area (m²)	Required Glazing Suite (A/B/C/D)
Apt Bld 1 L3 NW corner APT 38 T-C	7.2	85.9	66.6	19.3	94.4	A
Apt Bld 1 L3 W APT 36 T-B	7.8	65.4	44.5	20.9	68.8	A
Apt Bld 1 L3 E APT 31 T-A	7.8	64.6	46.1	18.5	51.7	A
Apt Bld 1 L3 SW corner APT 34 T-B	7.5	74.2	54.9	19.3	69.0	A
Apt Bld 2 L3 NE APT 33 T-D	7.4	77.2	64.5	12.7	108.0	A
Minimum	7.0		-	-		
Development-wide Weighted Average	7.3	80.6	65.9	14.7	-	
Maximum (Class 1 Villas)	-	-	66.4	12.1	-	
Maximum (Class 1 Rowhouses)	-	-	82.4	16.0	-	
Maximum (Class 2 Under & Overs and ILU Townhouses)	-	-	79.1	21.0	-	
Maximum (Class 2 Apartments)	-	-	70.5	20.9	-	

*Assumed values, as these dwelling types have not yet been designed.

The energy ratings have been completed with the following building fabric elements:

Building Fabric Element	Description
External Walls	External walls are modelled as Brick Veneer, Metal Cladding and FC Sheet, and will be insulated with added R2.5* thermal insulation unless specified otherwise. *Residential Rowhouse R6, and UO Type B2 Under (modelled as dwelling 4) and UO Over require added R2.7 to all external lightweight walls. *UO Over lightweight walls also require a reflective air gap (emissivity 0.05) of 20mm. Retaining walls will be insulated with R2.5 insulation where not adjacent to a garage.

Building Fabric Element	Description
	All external garage walls require no added insulation. Insulation material with minimum 20% recycled material content will be selected. The external wall colours are modelled as per the Materials Board: • Dark Rendered Cladding (SA=0.71 per Colorbond Woodland Grey) • Mid Rendered Cladding (SA=0.69 per Colorbond Basalt) • Light Rendered Cladding (SA=0.43 per Colorbond Shale Grey) • Timber-Look Cladding (SA=0.50) • Dark Vertical Cladding (SA=0.79 per Colorbond Monument Matt) • Mid Vertical Cladding (SA=0.69 per Colorbond Basalt) • Light Grey Vertical Cladding (SA=0.43) • Dark Grey Timber-Look Cladding (SA=0.69 per Colorbond Basalt) • Light Sand Brickwork (SA=0.55) • Red Brickwork (SA=0.65) • Brown Brickwork (SA=0.65) • Light Grey Brickwork (SA=0.65) • Dark Brickwork (SA=0.79) • Metal Cladding White (SA=0.35 per Colorbond First Light) • Groove Dark Grey Cladding (SA=0.58 per Colorbond Windspray) • Dark Grey Aluminium Cladding (SA=0.73 per Colorbond Monument)
Party Walls	Party walls between dwellings are modelled as double stud with R4.0 insulation added. (R2.0 to both sides) Internal walls adjacent to back-of-house, common corridors and services are modelled as plasterboard stud with R2.0 insulation added. Internal walls adjacent to common stairs and common lifts are modelled as plasterboard-lined concrete with R2.0 insulation added.
Internal Walls	Internal walls adjacent to private garages are to be insulated with added R2.5* thermal insulation, unless specified otherwise. *UO Under Type B2 Ground Level (modelled as dwelling 4) and UO Over require added R2.7 to all internal garage walls. All other internal walls require no added insulation, except those listed below, which require R2.5 added thermal insulation: • 3UO – Over: internal walls around bathroom and powder room *increased to R2.7*.

Building Fabric Element	Description
	• 4UO – Under: internal walls around bathroom and powder room *increased to R2.7.* • 5UO – Over: internal walls around bathroom and powder room *increased to R2.7.* • 7 ILU TH1 – L1: internal walls around bathroom. • 9 ILU TH2 – L1: internal walls around bathroom, and garage walls adjacent to the lift, stair and garage next door. • 10 ILU TH3 – GL: internal walls around powder room and adjacent to the lobby. • 11 ILU TH3 – L1: internal walls around powder room. • 13 ILU TH4 – L1: internal walls around bathroom. • 16 ILU TH5 – L2: internal walls around bathroom. • 22 R2: internal walls around laundry and powder room at Ground Level. • 23 R1C: internal walls around bathroom and ensuite at Level 1. • 24 R2: internal walls around laundry and powder room at Ground Level. • 26 R6: internal walls around bathroom at Ground Level.
Floors	**Villa** floors are modelled as CSOG and require added R1.1 thermal insulation under the slab excluding the garage. **Under & Over** Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage. Level 1 floors are modelled as timber construction and require added R3.2 thermal insulation where they are positioned over the garage. **ILU TH1** Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage. Level 1 floors are modelled as timber construction and require added R3.2 thermal insulation where they are positioned over the garage and lobby. ILU TH2 Ground Level floors are modelled as CSOG and require R2.3 thermal insulation under the slab excluding the garage. L1 floors are modelled as timber construction are require added R3.5 thermal insulation throughout. **ILU TH3** Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage. Level 1 entry/dining floors are modelled as CSOG with R2.3 underslab insulation, and as timber construction elsewhere. Level 1 timber floors require added R2.3 thermal insulation where they are positioned over the garage. **ILU TH4** Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage. Level 1 entry/dining floors are modelled as CSOG with R2.3 underslab insulation, and as timber construction elsewhere. Level 1 timber floors require added R3.2 thermal insulation where they are positioned over the garage.

Building Fabric Element	Description
	ILU TH5 Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab. Level 1 entry/dining/ kitchen floors are modelled as CSOG with R2.3 underslab insulation, and as timber construction elsewhere. Level 2 timber floors require added R3.2 thermal insulation where they are positioned over the garage and lobby. **Apartment Building** Ground Level floors (applicable to Fletcher Road Apartments only) are modelled as CSOG and require added R2.3 thermal insulation under the slab. Suspended floors are modelled as 200mm suspended slab. Where floors are above the carpark, or extend beyond the footprint of the floor below, R2.3 added thermal insulation is required. **Residential Rowhouse R1** Lower Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage. Ground Level entry/living floors are modelled as CSOG with R2.3 underslab insulation, and as timber construction elsewhere. Level 1 timber floors do not require insulation. **Residential Rowhouse R2** Lower Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage and store. Ground Level entry/living/study floors are modelled as CSOG with R2.3 underslab insulation, and as timber construction elsewhere. Ground Level timber floors require R2.3 insulation where above the garage and store. Level 1 timber floors do not require insulation. **Residential Rowhouse R5** Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab excluding the garage. Level 1 & Level 2 floors are modelled as timber construction. Level 1 timber floors require R2.3 insulation above the garage and where the floor is exposed below. **Residential Rowhouse R6** Ground Level floors are modelled as CSOG and require added R2.3 thermal insulation under the slab, excluding the garage. Level 1 & Level 2 floors are modelled as timber construction. Level 1 timber floors require R3.2 insulation above the garage and where the floor is exposed below.
Floor Coverings	Floor coverings are modelled as timber to kitchen/living/halls, tiles to bathrooms and laundries and carpet to bedrooms and WIRs.
Roof Insulation	**Villa** roofs will be required to be insulated with a minimum R4.0 added thermal ceiling insulation to achieve compliance. **Under & Over** Level 1 Colorbond roofs will be required to be insulated with a minimum R7.0 added thermal ceiling insulation to the entire roof to achieve compliance. Ground Level ceilings with garage and balcony above will be required to be insulated with a minimum R2.5, except for UO Under Type B2 (modelled as dwelling 4), which requires R5.0 added thermal ceiling insulation to achieve compliance. **ILU TH1 – TH4** Level 1 Colorbond roofs will be required to be insulated with a minimum R7.0 added thermal ceiling insulation to achieve compliance. Ground Level ceilings with roof and balcony above will be required to be insulated with a minimum R2.5 added thermal ceiling insulation to achieve compliance. **ILU TH5** Level 2 Colorbond roofs will be required to be insulated with a minimum R7.0 added thermal ceiling insulation, and to be designed

Building Fabric Element	Description
	with a reflective roof space to achieve compliance. Ground Level and Level 1 ceilings with roof and balcony above will be required to be insulated with a minimum R2.5 added thermal ceiling insulation to achieve compliance. **Apartment Building** Colorbond roofs will be required to be insulated with a minimum R4.0 added thermal ceiling insulation at the top level of each building to achieve compliance. Ceilings on lower levels, modelled as 200mm suspended slab, with roof and roof terrace above also require R4.0 insulation added to the ceiling. **Residential Rowhouse R1** ceilings do not require insulation at Lower Ground or Ground Level. Level 1 Colorbond roofs require a minimum R5.0 added thermal ceiling insulation to achieve compliance. **Residential Rowhouse R2** ceilings do not require insulation at Lower Ground Level. Ground Level roof where exposed above the kitchen requires a minimum R2.5 added thermal ceiling insulation, and Level 1 Colorbond roofs require a minimum R5.0 added thermal ceiling insulation to achieve compliance. **Residential Rowhouse R5** Ground Level roof where exposed above Bed 2 requires a minimum R2.5 added thermal ceiling insulation. Level 2 Colorbond roofs and Level 1 roof where exposed above require a minimum R5.0 added thermal ceiling insulation to achieve compliance. **Residential Rowhouse R6** Ground Level roof where exposed above (excluding the garage) requires a minimum R3.5 added thermal ceiling insulation. Level 2 Colorbond roofs and Level 1 roof where exposed above require a minimum R7.0 added thermal ceiling insulation to achieve compliance. **All Colorbond roofs**: roof colour modelled with a solar absorptance of 0.32 per Colorbond Surfmist.

Building Fabric Element	Description
Windows and Glazing	Windows / glazed doors are required to achieve the following glass-and-frame combined thermal performance values (refer Table 3, which identifies which glazing suite is applicable to each dwelling):

Glazing Suite A

Glazing Type	U-Value	SHGC	VLT
Fixed Window	2.70	0.58	0.62
Awning Window	2.87	0.39	0.41
Sliding Door	3.10	0.48	0.55
Double Hung Window	3.50	0.49	0.55
Hinged Door	3.50	0.42	0.46

Fenestration systems that can achieve these values can be found in argon-filled low-E double glazed glass in standard Capral aluminium frames.

Glazing Suite B

Glazing Type	U-Value	SHGC	VLT
Fixed Window	2.02	0.54	0.63
Awning Window	2.87	0.39	0.44
Sliding Door	2.46	0.40	0.46
Double Hung Window	2.40	0.48	0.58
Hinged Door	2.73	0.42	0.47

Fenestration systems that can achieve these values can be found in argon-filled low-E double glazed clear glass in Capral Futureline thermally-broken aluminium frames.

Glazing Suite C

Glazing Type	U-Value	SHGC	VLT
Fixed Window	1.78	0.50	0.68
Awning Window	2.70	0.37	0.47
Sliding Door	2.30	0.40	0.53
Double Hung Window	2.40	0.48	0.58
Hinged Door	2.50	0.39	0.51

Fenestration systems that can achieve these values can be found in Lightbridge double glazed clear glass in Capral Futureline thermally-broken aluminium frames.

Glazing Suite D

Glazing Type	U-Value	SHGC	VLT
Fixed Window	1.90	0.23	0.53
Awning Window	2.70	0.19	0.39
Sliding Door	2.20	0.20	0.44
Double Hung Window	2.30	0.21	0.47

<table>
<tr><th>Building Fabric Element</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><td>Hinged Door</td><td>2.50</td><td>0.20</td><td>0.41</td></tr>
</table>
Fenestration systems that can achieve these values can be found in double glazed clear glass in Capral Futureline AGG MAX thermally-broken aluminium frames.

Other glazing systems are considered in compliance only where the supplied ‘Total System’ performances (Glass & Frame) meet each of the following criteria:
• Less than or equal to the U-Value specified, and
• Within +/-5% of the SHGC value specified.

Frames: SA=0.73, per Colorbond Monument (Charcoal).

The following windows are to be changed, to improve the cooling loads and/or star ratings of individual dwellings:
• 3UO – Over: Living area west glazing to be reduced to 2700 width.
• 5UO – Over: Living area west glazing to be reduced to 2700 width. Bed 2 windows reduced to 1500 width. Lower 600mm of south-facing fixed living room windows removed behind the lounge.
• 7 ILU TH1 – L1: Living area west glazing to be reduced to 1950 width
• 13 ILU TH4 – L1: Living area west glazing to be reduced to 1400mm in height (fixed bottom panels removed).
• 26 R6 – All three sliding doors at L1 to be selected with two operable panels rather than one operable panel (of the three glazed panels).
• Apt Bld 1 APT 11 T-C – north-facing bedroom to be provided with an awning window. Awning modelled to the upper portion, 600mm high at head height of 2700.
• Apt Bld 1 APT 36 T-B – Living area sliding door to be selected with two operable panels rather than one operable panel (of the three glazed panels).
</td></tr>
<tr><td>Shading</td><td>Vertical metal balustrades modelled with 20% opacity.</td></tr>
<tr><td>Ceiling Fans</td><td>1,200mm diameter ceiling fans are required to the following rooms, to reduce the cooling loads of individual dwellings (one fan per room unless specified otherwise):
• 3UO – Over: Kitchen/living (two fans; one to the dining and another to the lounge), and both bedrooms.
• 5UO – Over: Kitchen/living (two fans; one to the dining and another to the lounge), and both bedrooms.
• 7 ILU TH1 – L1: Kitchen/living and one in each bedroom.
• 9 ILU TH2 – L1: 2 in Kitchen/living, and one in each bedroom.
• 13 ILU TH4 – L1: 2 in Kitchen/living and one in each bedroom (including flexible room).
• 15 ILU TH5 – L1: 2 in Kitchen/living, and one in each bedroom</td></tr>
</table>

Building Fabric Element	Description
	• 26 R6 - Kitchen/living (two fans; one to the dining and another to the lounge), and master bedroom. • Apt Building 1 **APT 11 T-C**: Kitchen/living.
Fence Types	The following assumptions have been made for each fence type: Types 1, 4 – 1,200mm high, 50% opacity fence on top of 600mm high retaining wall Types 2, 3 – 1,200mm high, 50% opacity fence at ground level Type 5 – 1,800mm high, 50% opacity fence at ground level Type 6 – 1,800mm high, 100% opacity fence on top of 600mm high retaining wall Types 7, 8 – 1,800mm high, 100% opacity fence at ground level Existing paling fence to remain – 1,800mm high, 100% opacity fence at ground level.
Building Sealing	All doors, windows, exhaust fans and openings will be sealed to not allow air infiltration in the townhouses. Exhaust fans have been assumed in all kitchens, to laundry cupboards, bathrooms & ensuites.
Downlights	Downlights will be 'IC4' rated (Insulation Contact) to allow for insulation to be placed over the top, preventing air-leakage between habitable rooms and ceilings.

Note: The above building elements may vary as the plans are refined for building approval, however the energy rating performance for each dwelling will achieve not less than 7 Stars.

Figure 8: Key to ILU Energy Ratings

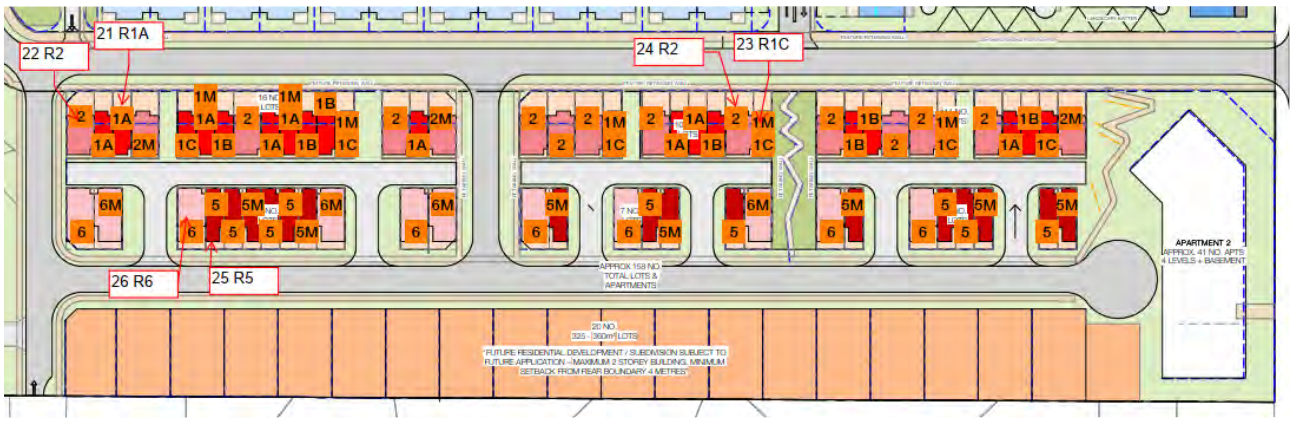


Figure 9: Key to Residential Rowhouse Energy Ratings

Appendix 3 – MUSIC Assessment & WSUD Report

Objectives

The quality and quantity of stormwater leaving a site can have a significant impact on the surrounding infrastructure and waterways. Impervious surfaces move water quickly and efficiently out of built-up areas straight into stormwater infrastructure, which in turn quickly moves the untreated water into natural watercourses. This process does not treat the stormwater and as the water flows into natural water courses, it causes erosion and pollution of those waterways with the rubbish, sediments, pathogens, and other pollutants that run off the impervious surfaces into the stormwater drains.

New developments in the Shire of Yarra Ranges must comply with *Clause 53.18* and the best practice performance targets for suspended solids, total phosphorous and total nitrogen, as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999. Currently, these water quality performance targets require:

- Suspended Solids - 80% retention of typical urban annual load.
- Total Nitrogen - 45% retention of typical urban annual load.
- Total Phosphorus - 45% retention of typical urban annual load.
- Litter - 70% reduction of typical urban annual load.

New developments must also incorporate treatment measures that improve the quality of water and reduce flow of water discharged into waterways (such as collection and use of rainwater/stormwater on site) and encourage the use of measures to prevent litter being carried off-site in stormwater flows. The proposed development has addressed these requirements by identifying the impervious surfaces within the site and implementing treatments to mitigate the impacts of stormwater leaving the site. To assess these initiatives, the MUSIC tool – which is an industry accepted tool – was used to determine the treatment effectiveness of these initiatives.

The MUSIC assessment was undertaken by Alluvium, and all requirements within this section of the SMP are based on the assessment undertaken by Alluvium.

Site Characteristics

Alluvium separated the site into two precincts and assessed each precinct separately. Figure 10 on the following page shows this delineation.

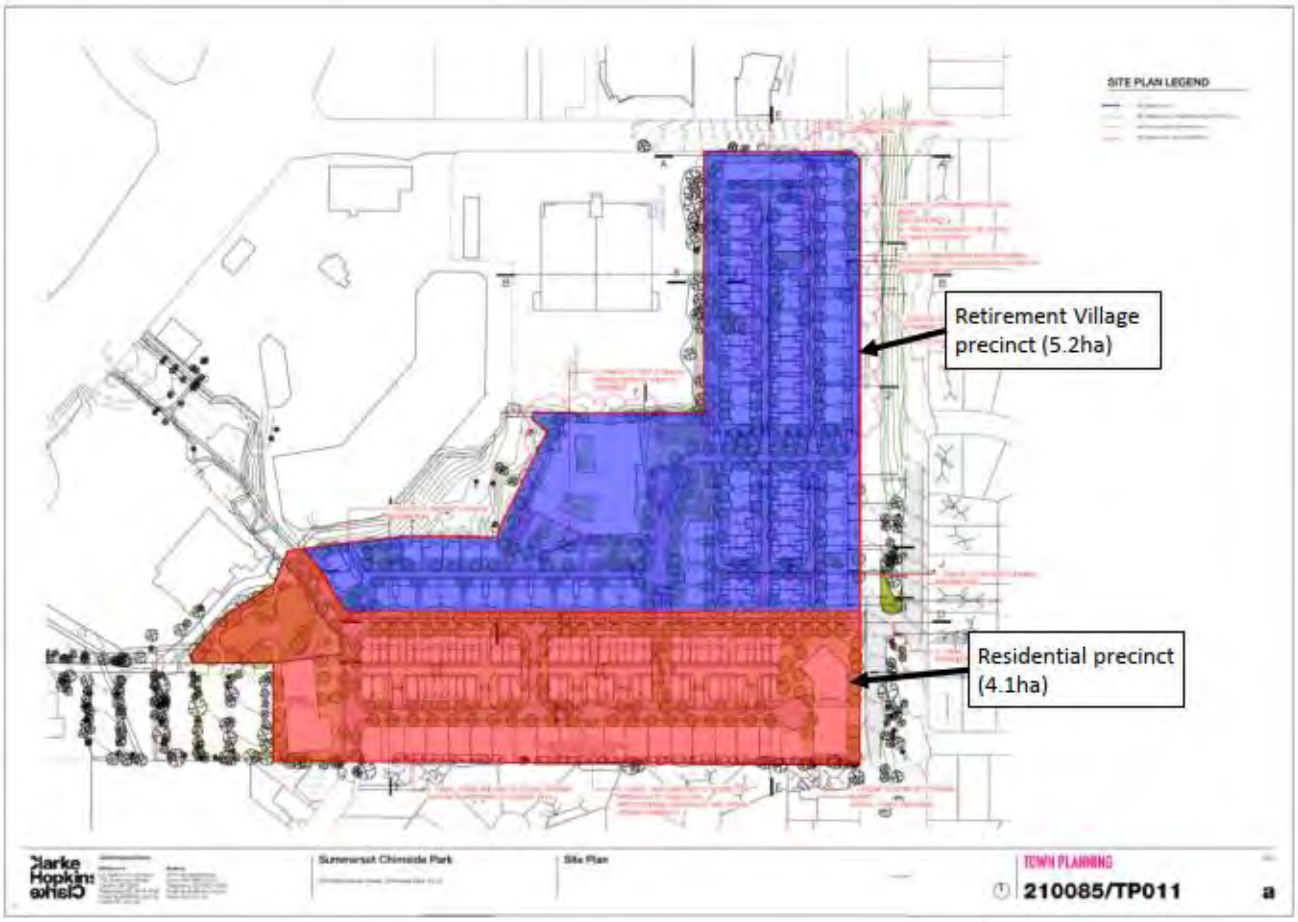


Figure 10: Site delineation (mark-up by Alluvium)

Stormwater Management Initiatives

Stormwater treatment initiatives will need to be implemented. The following section presents the different surfaces that have been identified by Alluvium for treatment, and the required treatments. The initiatives to manage stormwater flows for the building area will underpin the overall performance of the site and its ability to meet stormwater management objectives.

Table 4: List of areas and their stormwater treatment measures

Surfaces	Area	Required Treatment
Site Area	92,830.0m^2	Detailed below (covers both the Retirement Village and the Residential Subdivision).
Retirement precinct RACF roof area	4,750m^2	Entire RACF roof area drains to an 80kL rainwater tank, to be used for laundry within the RACF Building and for irrigation around the perimeter of the RACF Building. Laundry demand based on daily washing of all bed linen with efficient Ozone Laundry Systems, estimated at 40L/bed/day. Over a year, for 100 beds, this amounts to 1.46ML.
Retirement precinct 46,620m^2 total area	31,235.4m^2 impervious area + 15,384.6m^2 pervious area	These areas (roads, paths, remaining roofs, vegetated areas) drain to a total of 210m^2 raingarden area, with 100mm extended detention depth.

Surfaces	Area	Required Treatment
Residential precinct 38,000m^2 total area	25,840m^2 impervious area + 12,160m^2 pervious area	These areas (roads, paths, roofs, vegetated areas) drain to a total of 100m^2 raingarden area, with 150mm extended detention depth.
-	-	Note: recycled water connected to all toilets, and to all remaining irrigation systems, site-wide.

Stormwater Quality Modelling Results

The impervious surfaces and recommended treatments have been assessed using the MUSIC tool, by Alluvium. The MUSIC model of the treatment measures demonstrates that minimum pollutant load reductions are met in both precincts.

Stormwater Runoff from Roof Catchment Areas

Treatment – Rainwater Tanks

Rainwater tanks are considered one of the most practical and effective mechanisms to reduce the quantity and velocity of stormwater leaving a site. Rainwater tanks will capture the stormwater that runs off the roof surfaces of the RACF Building, and store it for reuse in the laundry (and for irrigation if surplus available), effectively reducing the actual volume of water leaving the site. Instead of rainwater being considered as waste and a burden on the infrastructure, it is seen as a resource which has the double benefit of reducing demand on potable water supplies and as a stormwater mitigation initiative.

Treatment – Raingardens

Raingardens are low-maintenance stormwater filtration measures employed to reduce the concentration of pollutants within stormwater leaving a property. Stormwater is captured when running off hard surfaces and subsequently flows through adjacent raingardens encountering various filtration media and appropriate plants[2].

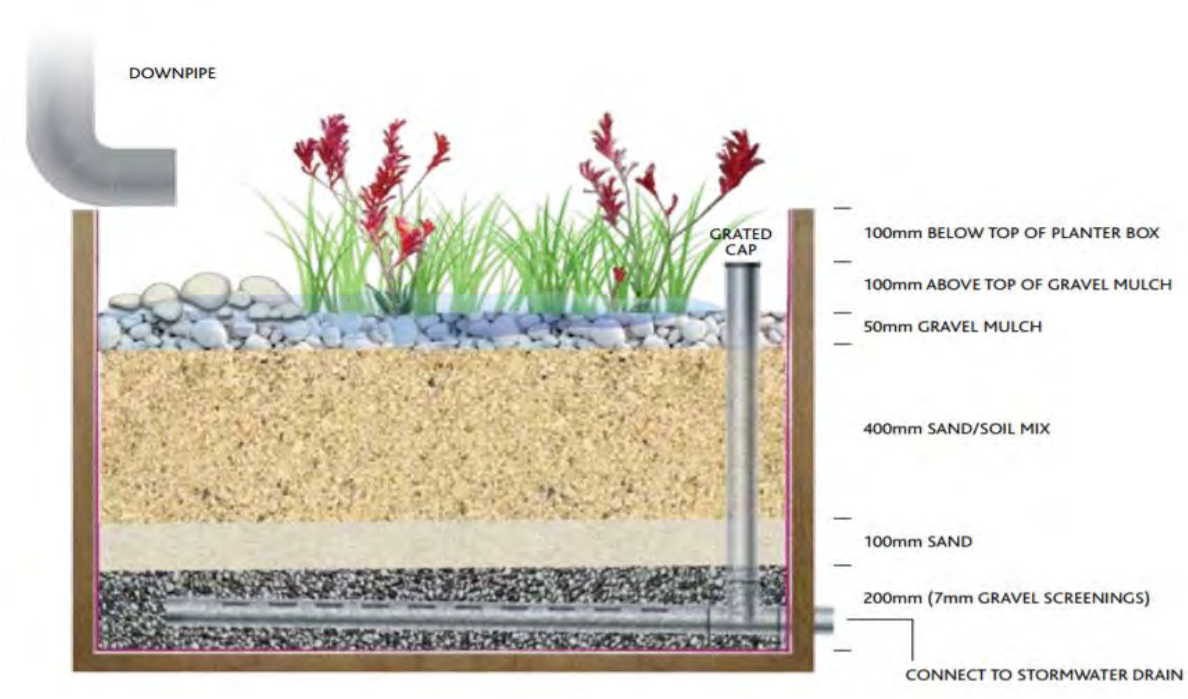


Figure 11: Example cross-sectional view of proposed planter box raingardens (Source: Melbourne Water[5])

[5] Please refer to "Planter box raingarden instruction sheet" and "Inground raingarden instruction sheet" from "How do I build a raingarden" section of Melbourne Water website https://www.melbournewater.com.au/water-data-and-education/environment-and-sustainability/why-we-need-save-

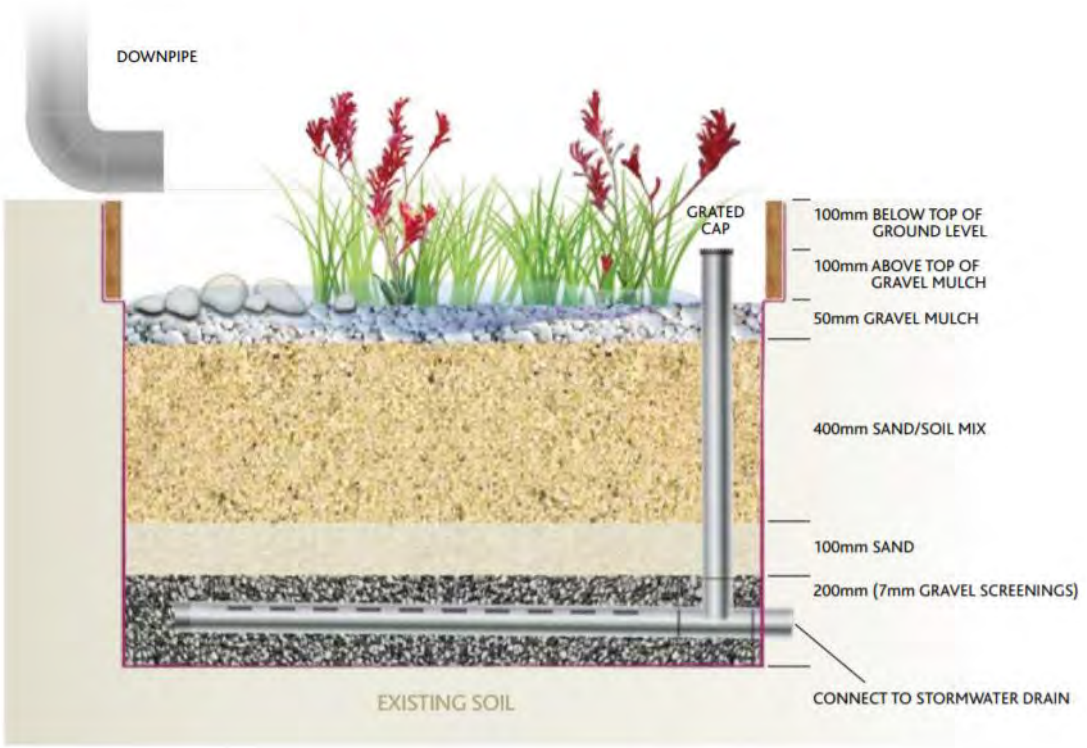


Figure 12: Example cross-sectional view of proposed inground raingarden (Source: Melbourne Water[2])

water/tips-saving-water-0 accessed 11 April 2022. It is noted that the cross-sectional composition of the proposed raingardens will resemble Figures 11 & 12.

Raingarden Design

The following steps are to be taken when constructing the raingardens (refer Figures 11 & 12):

- Excavate with a gentle incline toward the stormwater outlet.
- Line raingarden base and sides with a PVC liner, sealing joins with PVC tape.
- Add 7mm screenings (gravel, which must be free from excess dirt) up to a depth of 50mm.
- Place a 90mm diameter slotted drainage pipe along the centre of the raingarden, capped at one end.
- Connect a 90mm diameter vertical overflow pipe to the slotted drainage pipe, ensuring that the top of the overflow pipe sits 100mm above gravel mulch and 100mm below surrounding ground level.
- Cap the overflow pipe temporarily to prevent soil/filter media from entering during construction.
- Prepare and install a frame for the raingardens, with the top edge level with surrounding ground level. Note that the frame is required to sit higher than the overflow pipe. The PVC liner is to be placed between the frame and surrounding ground.
- Add an additional 150mm depth of 7mm screenings (gravel), covering the drainage pipe.
- Place 100mm of white-washed sand over the gravel layer, pressed firmly.
- Add 400mm depth of a mixture of 4 parts white-washed sand and 1 part topsoil, over the sand layer, pressed firmly.
- Direct pipework into the raingardens.
- Select suitable plant species. 50% of the raingarden is to be planted with plants which are effective pollutant removers, such as:
    - *Carex appressa*
    - *Lomandra longifolia*
    - *Juncus flavidus*
    - *Melaleuca ericifolia*
    - *Goodenia ovata*

  The other 50% of raingarden area is to be planted with species which survive well in a dry environment with intermittent wet periods. Suitable native species include:
    - *Anigozanthus sp.*
    - *Calocephalus lacteus*
    - *Dianella sp.*
    - *Lomandra sp.*
    - *Pattersonia occidentalis*
    - *Wahlenbergia communis*

  Ensure to plant densely, minimum 6 plants per m^2.
- Following planting, cover with 50mm gravel mulch around the plants. Where pipes enter each raingarden, place some large flat rocks to help spread the incoming water. Note that timber mulch is to be avoided, as it is liable to causing blockages.
- Finally, remove the temporary end cap on the overflow pipe and replace with a 90mm PVC finishing collar with domed pipe grate.

Melbourne Water provides detailed advice on how to build a raingarden, which should be referenced by the landscaping contractor during construction:

https://www.melbournewater.com.au/water-data-and-education/environmental-issues/why-we-need-save-water/tips-saving-water/raingardens

Stormwater System Maintenance

The proposed stormwater management devices will require regular maintenance and monitoring to ensure they function as designed. An operation maintenance manual will be prepared for the site. The following section outlines key maintenance tasks and recommended frequency. The property owner will be responsible for continuous implementation of stormwater management device maintenance.

Rainwater Tank Systems

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the rainwater tank system are as follows:

Rainwater tank system element	Frequency	Maintenance Task
Rainwater tanks – Minor service	Quarterly	• Check for any damage/compression • Check that supporting base is free of cracks and movement • Empty and clean first flush diverters • Remove and clean inlet and outlet/overflow strainers • Check correct operation of potable mains back up switch • Check that mesh covers have not deteriorated and intact • Check for mosquito infestation
Rainwater tanks – Major service	Every 2 years	• Clean tank to remove accumulated sludge
Pumps	Every 6 months	• Service water pump to prolong life
Roof and gutters	Every 6 months	• Clean out of leaves/debris

Raingardens

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the raingardens are as follows:

Raingarden system element	Frequency	Maintenance Task
Plants	As required	• Replace plants when necessary • Remove weeds as required
Gravel mulch	As required	• Repair erosion by rearranging gravel/rocks after initial heavy rain events if required
Downpipe	As required	• Remove any sediment/build-up from the downpipe if blocked
Roof and gutters	Every 6 months	• Clean out of leaves/debris

Disposal of Waste Materials

The accumulated pollutants found in the stormwater treatment systems must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes.

Stormwater Runoff Treatment during the Construction Stage

Treatment – Various

Stormwater management in the construction stage will include measures which will be put in place to minimise the likelihood of contaminating stormwater discharge from the site as well as reduce the velocity of the flows generated from the building as it is being constructed. This will mean ensuring buffer strips are in place, and the site will be kept clean from any loose rubbish. More information is available from "*Keeping Our Stormwater Clean – A Builder's Guide*" by Melbourne Water[6]. The diagram below is an illustration of the various objectives which assist in minimising the impacts of stormwater runoff typical during the construction phase. Typical pollutants that are generated from a construction site during a rainfall event include:

- Dust
- Silt
- Mud
- Gravel
- Stockpiled materials
- Spills/oils
- Debris/litter

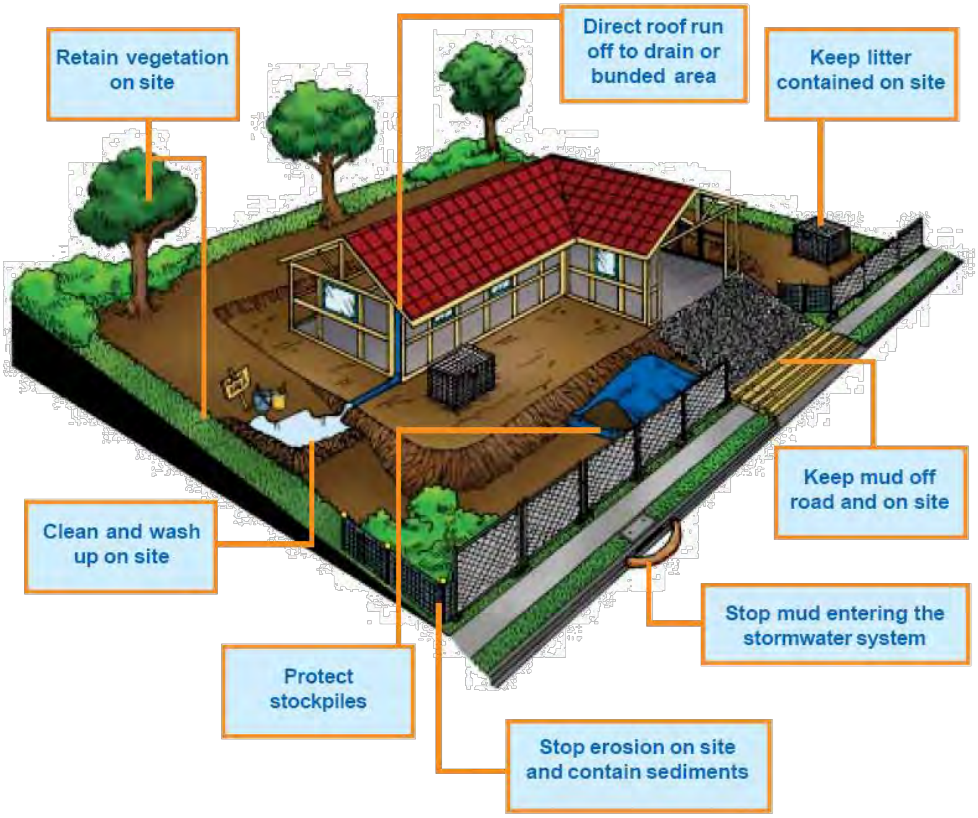
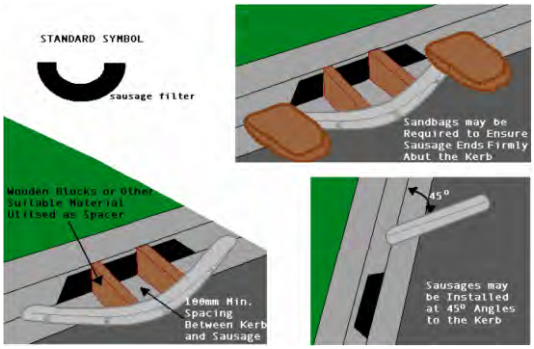


Figure 13: Stormwater will be effectively managed during construction phase according to the requirements listed in "Keeping Our Stormwater Clean – A Builder's Guide".

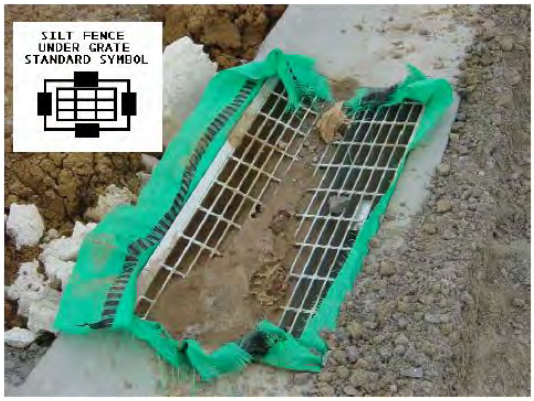
To reduce the impacts and minimise the generation of these pollutants the following measures are proposed. The symbols embedded within each image are typically used for Construction Environmental Management Plans.

[6] For copies, please contact Melbourne Water on 131 722.

Gravel Sausage filters – to be placed at the entrance of pits/side stormwater inlets. These permeable sacks will filter the suspended soils and sediments and any other litter carried by the stormwater to prevent the pollutants entering the system.



Silt Fences Under Grates - Silt fence material may be placed under the grate of surface-entry inlets to prevent sediment from entering the stormwater system.



Temporary Rumble Grids – these are designed to open the tread on tires and vibrate mud and dirt off the vehicle (in particular the chassis). This will heavily minimise the amount of soil/dirt deposited on local roads where it can be washed (by rainfall or other means) into the stormwater drains.

Appendix 4 – Green Star VOC and Formaldehyde Limits

Table 4: Maximum Volatile Organic Compound Levels for construction materials (Source: Green Building Council Australia – Green Star Buildings Submission Guidelines Version 1, 2021)

Product Type/Sub Category	Max TVOC Content (g/L of ready-to-use-product)
Paints, Adhesives and Sealants	
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100
Carpets	
Total VOC limit	0.5 mg/m² per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m² per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m² per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5 mg/m² per hour

Table 5: Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Buildings Submission Guidelines Version 1, 2021)

Formaldehyde emission limit values for different testing methods	
Test Method	**Emission Limit/ Unit of Measurement**
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³
ASTM E1333	≤0.12mg/m³
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m²hr

Appendix 5 – BESS Daylight Assessment Summary

The daylight amenity for the multi-unit residences classified as apartments (Under Overs, Townhouses, Fletcher Apartments, Apartment Building 1, and Apartment Building 2) have been assessed against the BESS requirements. Dwellings are assumed to have good access to daylight if they meet the following requirements:

- Living areas and bedrooms are less than 8m deep (5m if south facing).
- Living areas and bedrooms have a floor-to-ceiling height of at least 2.7m.
- Glazing to living areas has a Visible Light Transmittance (VLT) of at least 60%.
- Living areas have an external facing window (not into a courtyard, light well or other major obstruction).
- The building complies with all the building separation tables[7].

For dwellings that do not meet the above deemed-to-satisfy requirements, BESS calculates compliance using floor and window size, daylight obstructions (view angles) and glazing orientation.

The table below summarises the results of the daylight assessment.

Building	Dwelling Description	Designation	Quantity	Auto-Pass?	Floor Area	Vertical Angle	Horizontal Angle	Window Area	Orientation	Compliant?
Under Overs	Under Overs - Edge condition	Living	44	Yes						Yes
	Under Overs - No edge condition - Lower	Living	19		33.9	36.3	92.3	4.7	W	No
	Under Overs - No edge condition - Upper	Living	19		33.4	38.7	96.9	7.6	W	Yes
	Under Overs	Bedroom	164	Yes						Yes
Townhouses	Townhouses - TH1, TH2, TH3 (Upper only), TH4, & TH5	Living	92	Yes						Yes
	Townhouses - TH3 - Lower	Living	4		33.7	90.0	180.0	6.6	W	Yes
	Townhouses - TH1, TH2, TH3, TH4, & TH5	Bedroom	230	Yes						Yes

[7] The building separation tables can be found here: https://bess.net.au/tool-notes/6

Building	Dwelling Description	Designation	Quantity	Auto-Pass?	Floor Area	Vertical Angle	Horizontal Angle	Window Area	Orientation	Compliant?
Fletcher Apartment	Fletcher Apt. - B, LG, & G NW corner Apt.	Living	3		40.3	31.5	122.5	12.15	N	Yes
	Fletcher Apt. - G & FF central Apts. and G NE corner Apt.	Living	5		35.4	34.4	99.0	8.1	N	Yes
	Fletcher Apt. - FF NE corner Apt	Living	1	Yes						Yes
	Fletcher Apt. - B, LG, G, & FF	Bedroom	19	Yes						Yes
	Apt. B1 - 1 & 2 Bed - E	Living	12		33.2	34.0	75.1	8.1	E	Yes
Apartment Building 1	Apt. B1 - GF - 2 Bed - SE	Living	1		33.2	90	152.4	8.1	S	Yes
	Apt. B1 - GF, L1, L2, & L3 - 2 Bed - W	Living	16		33.2	36.9	110.8	8.1	W	Yes
	Apt. B1 - GF, L1, L2, & L3 - 3 Bed	Living	9	Yes						Yes
	Apt. B1 - GF - 2 Bed - SE	Bedroom	1		17.9	90	180	2.43	S	
	Apt. B1 - All Apts except GF 2 Bed in SE corner	Bedroom	88	Yes						Yes
Apartment Building 2	Apt. B2 - 1 & 2 Bed - E	Living	12		33.2	34.0	72.0	8.1	E	No
	Apt. B2 - 1 & 2 Bed - W	Living	12		33.2	36.9	93.0	8.1	W	Yes
	Apt. B2 - 2 Bed - SE	Living	3	Yes						Yes
	Apt. B2 - 3 Bed	Living	14	Yes						Yes
	Apt. B2 - 1, 2, & 3 Bed	Bedroom	88	Yes						Yes