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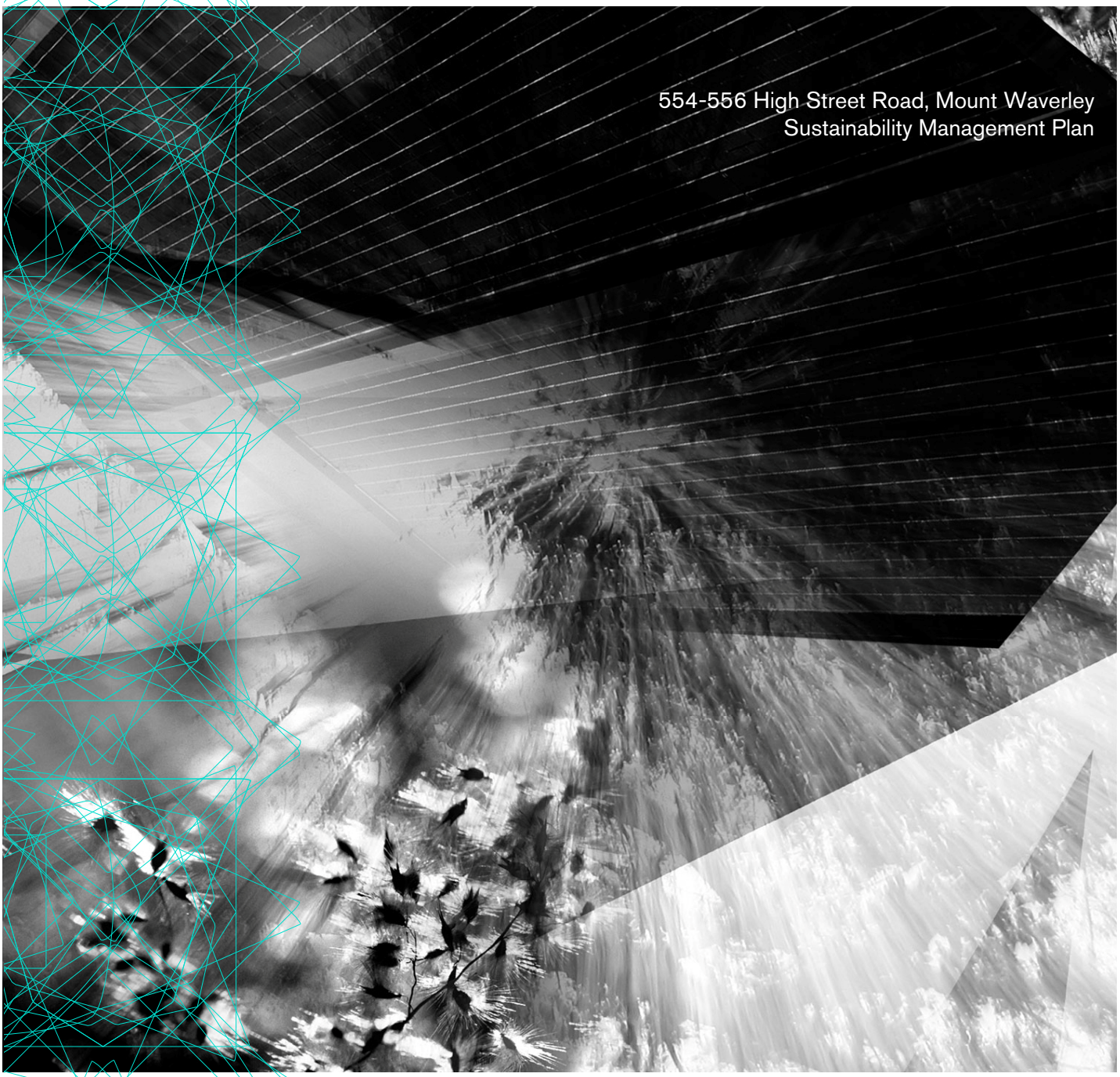

554-556 High Street Road, Mount Waverley
Sustainability Management Plan

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

Proposed Retirement Village Development
554-556 High Street Road, Mount Waverley

Sustainability Management Plan (SMP)

December 2018

S2781a SMP.V2

PREPARED BY:

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Version	Date of Issue	Description	Author	Approved
V1	15-10-2018	For Submission	AN	LR
V2	18-12-2018	Updated as per latest drawings	AN	LR

1. Introduction

This Sustainability Management Plan (SMP) has been prepared to assist the design, construction and operation of the proposed retirement village development at 554-556 High Street Road, Mount Waverley to achieve a range of best-practice sustainable development objectives.

Sustainable Development Consultants has assessed the proposed development and provided input to the design team. This SMP captures initiatives which ensure that the development meets the sustainability objectives of the Monash City Council.

1.1 Site and Development Description

The site is located at 554-556 High Street Road and is currently occupied by different commercial buildings such as a fitness centre, a yoga studio and a used car dealer, which are proposed to be demolished prior to the construction of the development. The site is located within a well-established residential area, approximately 20km southeast of the Melbourne CBD. A metropolitan train station is located within walking distance of the site which will provide good public transport access for residents to other inner suburbs and the Melbourne CBD.

The proposed development consists of a seven-storey mixed-use building containing 83 retirement village units above a basement garage with two tenancies, being a café and medical centre, on the ground floor with street frontage on High Street Road.

Figure 1: 554-556 High Street Road, Mount Waverley site location (Source: Melway).

The Development Summary is as follows:

Area Type	Inclusions
Total Site Area	2,619m^2
Units	83 Units (19 x one-bedroom and 64 x two-bedroom)
Amenities	Yoga Facility – 85m^2 Pool/Gym – 292m^2 Food and Drink Premises – 149m^2
Parking	88 retirement village car spaces, 5 food and drink car spaces 63 bicycle spaces

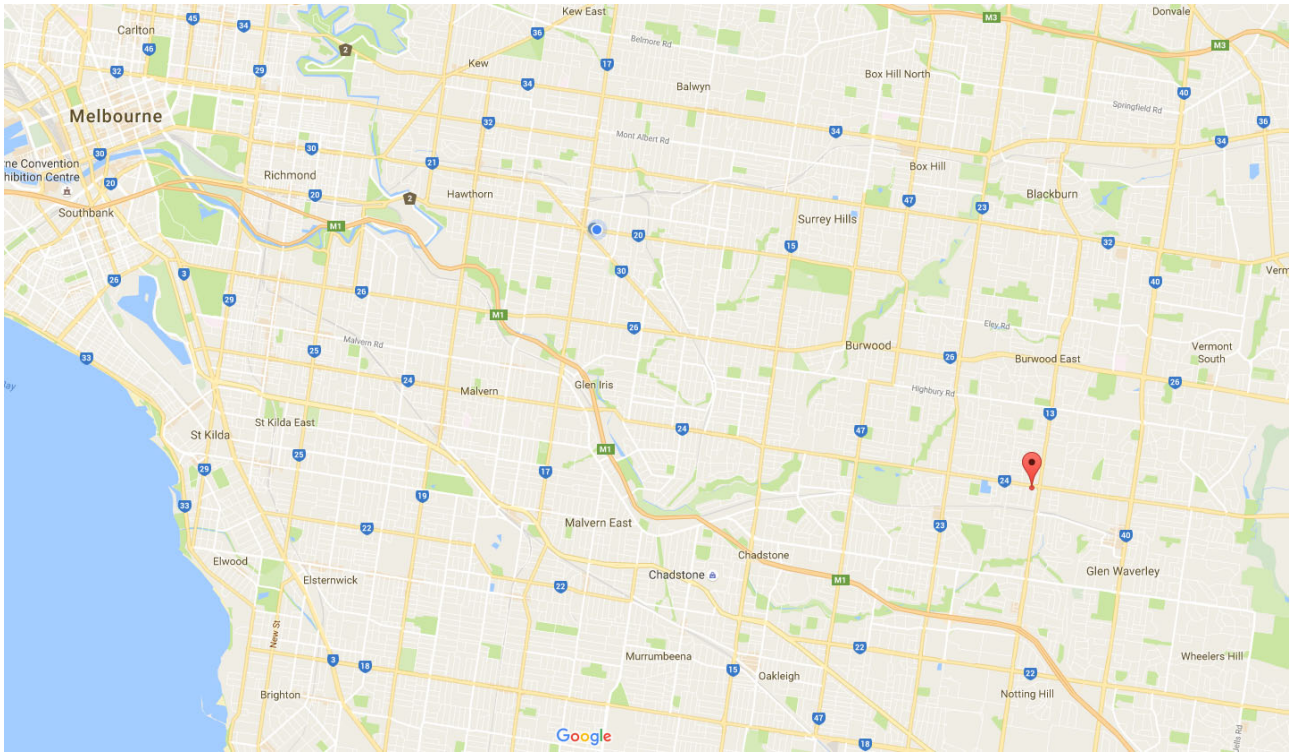


Figure 2: The red balloon shows the location of 554-556 High Street Road, Mount Waverley (Source: Google).

1.2 City of Monash Requirements

The City of Monash expects the High Street Road development to be designed, built and maintained at a level that provides good practice ESD outcomes as described in the Local Planning Scheme Clause 21.13 "Sustainability and Environment" and the Water Sensitive Urban Design requirements of Local Policy Clause 22.04 *Stormwater Management Policy*. The development will address the following:

- Construction, Building and Waste Management;
- Indoor Environment Quality;
- Energy Efficiency;
- Transport;
- Water Efficiency & Stormwater Treatment;
- Building Materials; and
- Urban Ecology & Innovation.

In order to address these categories, the proposed development will aim for good environmental practice; including compliance with required outcomes using the FirstRate 5 energy assessment tool. This will be in line with requirements of Clause 21.13 of the City of Monash.

Key Council Nominated Objectives from the Clause 21.13 are as follows:

Energy performance:	• Minimise energy usage; • Reduce total operating greenhouse gas emissions; and • Reduce energy peak demand through particular design measures (e.g. appropriate building orientation, shading to glazed surfaces, optimise glazing to exposed surfaces, space allocation for solar panels and external heating and cooling systems).
Water efficiency and stormwater management:	• Improve water efficiency; • Reduce total operating potable water use; • Encourage collection and use of stormwater; • Incorporate water sensitive urban design, including stormwater re-use;
Waste Management:	• Promote waste avoidance, reuse and recycling during the design, construction and operation stages of development;

	• Ensure durability and long term reusability of building materials; and • To ensure sufficient space is allocated for future change in waste management needs, including (where possible) composting and green waste facilities.
Transport:	• Ensure that the built environment is designed to promote the use of walking, cycling and public transport and minimise car dependency.

1.3 ESD Assessment Tools

There are a number of calculators and modelling programs available in Victoria to assess proposed developments against benchmarks set by the Victorian government, local councils and the Building Code of Australia. Different tools are used to assess different aspects of the development including the:

- Built Environment Sustainability Scorecard (BESS) which covers the overall sustainability of the development;
- FirstRate5, which covers the thermal efficiency of the building envelope; and
- The Stormwater Treatment Objective – Relative Measure (STORM) calculator, which addresses stormwater quality considerations for the development.

All tools have minimum compliance requirements. FirstRate5 and STORM have requirements that are mandatory for Victoria. The BESS tool is typically used to demonstrate that a development meets best practice sustainability benchmark requirements as part of a planning permit application for the participating council.

1.3.1 BUILT ENVIRONMENT SUSTAINABILITY SCORECARD (BESS)

BESS was developed by the Council Alliance for a Sustainable 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 developments meet 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 Monash City Council's ESD 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, stormwater and IEQ areas. An overall score of 50% for the project represents 'Best Practice' while a score over 70% represents 'Excellence'.

1.3.1 FIRSTRATE 5

The energy efficiency of the units' thermal envelopes has been assessed using FirstRate 5, which is an energy modelling software program to rate units on a 10-Star scale. The tool uses the Chenath engine (as a nationally recognised energy benchmarking) to rate units based on climate zone, materials used in a structure, positioning, orientation and building sealing. Higher scores are achieved primarily through better material selection, improvements in glazing, and insulation. It is noted that the 2016 BCA (Building Code of Australia) will apply to this development. A representative sample has been modelled to predict the average heating and cooling energy use of the development. The results of the FirstRate assessments can be found in Appendix 1 of this report.

1.3.3 MELBOURNE WATER STORM TOOL

Melbourne Water has developed the STORM calculator to simplify the analysis of stormwater treatment methods. The calculator is designed for the general public to be able to assess simple Water Sensitive Urban Design (WSUD) measures on their property and has been developed specifically for small developments. The STORM Calculator is able to display the amount of treatment that typical WSUD measures will provide in relation to best practice targets. However, it does not include all of the types of treatment measures available. It has been restricted to rainwater tanks, ponds, wetlands, rain garden trenches, infiltration systems, buffers and swales[1]. The results of the STORM assessment can be found in Appendix 3.

[1] The STORM tool provides only the most basic of options for a typical, smaller scale urban development. For more information visit http://www.melbournewater.com.au/content/library/wsud/using_storm.pdf

2. Sustainability Initiatives

The following sections outline the initiatives which will be included in the development and implemented throughout the design and construction process. Initiatives that meet the BESS benchmark have a reference next to them, e.g. (BESS Management 4.1). Some initiatives without the BESS reference have been included, since they contribute to the overall sustainability of the development.

These 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 Construction, Building and Waste Management

Initiatives included in 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
Metering and Monitoring (BESS Management 3.1, 3.2 & 3.3)		
Separate meters (water, hot water and electricity) will be provided for each unit and tenancy where appropriate. All common area services (e.g. common lighting, car park ventilation) will be separately sub metered.	Services Consultant	Construction Documentation
Construction Waste Management		
The builder will develop a waste management plan for the pre-construction, civil works and construction phases. This will include the following: • Waste generation; • Any waste systems; • Minimisation Strategy; • Performance / Reduction targets; • Bin quantity and size; • Collection frequency; • Waste contractors; • Signage; and • Monitoring and reporting including frequency and method. The waste management plan will include a requirement for not less than 80% of all demolition, land clearing, civil works and built form construction waste to be recycled or re-used.	Builder	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
The waste management plan 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.		
Building User Guide (BESS Management 4.1)		
A Building User's Guide (BUG) will be developed for the staff and residents in retirement village. The BUG will be comprehensive and will include training on inspection of the use of systems specific to the development, such as lighting and garbage chute, additional descriptions of systems installed in the building, sustainable transport in the area, and sustainable living suggestions in relation to the development.	Developer	Construction Documentation
Universal Access		
The development will be designed for universal access in accordance with AS1428.2 to allow patrons with limited mobility to enter and use the premises.	Architects	Design Development
Commissioning of Building Systems		
Central building services and operational features must be commissioned correctly in order for them to operate as designed and achieve the intended environmental benefits. Attention to commissioning is imperative as this process is commonly performed and/or documented poorly. As a result, a commitment will be made to commission building services to a relevant standard (e.g. AIRAH, ASHRAE, or CIBSE). In addition, simple, low tech controls are included which allow for systems to be managed manually rather than automatically. This will reduce risks and costs associated with the commissioning and maintenance of complex control systems, and ensure that systems have a longer operational life.	Services Contractor	Construction Documentation
Operational Waste (BESS Waste 2.2)		
The development will be provided with two conveniently accessible dedicated central storage rooms at the basement level which will be sufficiently sized for both waste and recycling. The recycling facilities will be at least as convenient for occupants as facilities for general waste. Provisions will also be made for the inclusion of both waste and recycling receptacles within units to help encourage occupants to separate their waste at the point of disposal.	Architect	Design Development

Figure 3: Examples of kitchen waste bins incorporated into joinery.

2.2 Indoor Environment Quality

Indoor Environment Quality (IEQ) addresses 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
Volatile Organic Compounds (VOCs)		
All paints, adhesives and sealants and flooring will not exceed limits outlined in Appendix 3. Alternatively, products will be selected with no VOCs. Paints such as eColour, or equivalent, should be considered.	Architect	Construction Documentation
Formaldehyde Minimisation		
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Alternatively, products will be specified with no Formaldehyde. Emissions limits are listed in Appendix 3. Products such as Ecological Panel – 100% post-consumer recycled wood (or similar) will be considered for use within the development.	Architect	Construction Documentation
Acoustic Comfort		
Acoustic comfort will be achieved in the units by limiting the internal ambient noise levels. Units and ground floor tenancies will be constructed to ensure good acoustic separation between spaces. Air-conditioning units will be placed away from windows were possible.	Services Consultant	Construction Documentation
External Views		
All living areas will be provided with access to high quality external views.	Architect	Design Development
Daylight Access & Improvement (BESS IEQ 1.1, 1.2, 1.3, 1.4 and 1.5)		
All living areas, bedrooms and ground floor tenancies will have access to an external window. The depth of living areas from a window has been limited to 8m for most units, allowing daylight to spread evenly within the space. All glazing to the living areas will have a minimum 60% Visible Light Transmittance (VLT). In addition, overall ceiling height is at least 2.7m across the development. These features will help the project achieve the adequate daylight access. Additional daylight modelling has been conducted and has concluded that 92% of living areas and 100% of bedroom areas will meet minimum BESS daylight requirements. 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
Artificial Lighting Level		
A higher illuminance level will be provided for task areas such as the kitchen sink/benches and over bathroom/ensuite basins to ensure that there is adequate light to carry out tasks in these areas.	Services Consultant	Construction Documentation
Mechanical Exhaust - Kitchens		
All kitchens will have a separate dedicated exhaust fan (range hood) which will not be recycled to any enclosed space within the building.	Services Consultant	Construction Documentation
Glazing		
The units will be fitted with double glazed windows. The double glazing brings multiple benefits to the units such as a better thermal performance and the reduction of the amount of condensation that forms on the inside of the glass which will help prevent the formation of mould in the units.	Architect	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
Effective Natural Ventilation (BESS IEQ 2.1)		
The units, ground floor tenancies and common areas will be fitted with operable windows to promote natural air movement through the spaces. Highlight windows have been incorporated into central units that help to further enhance cross-ventilation. This will provide opportunity for passive air changes within each different area which helps reduce the potential build-up of mould and other airborne toxins. Natural ventilation can also, when weather conditions are suitable, reduce the need for mechanical cooling. Fly screens, window locks and door catches will be included to encourage and aid natural ventilation in the units. Figure 4 shows an example of cross-ventilation pathways in units 412 and 413.	Architect	Design Development

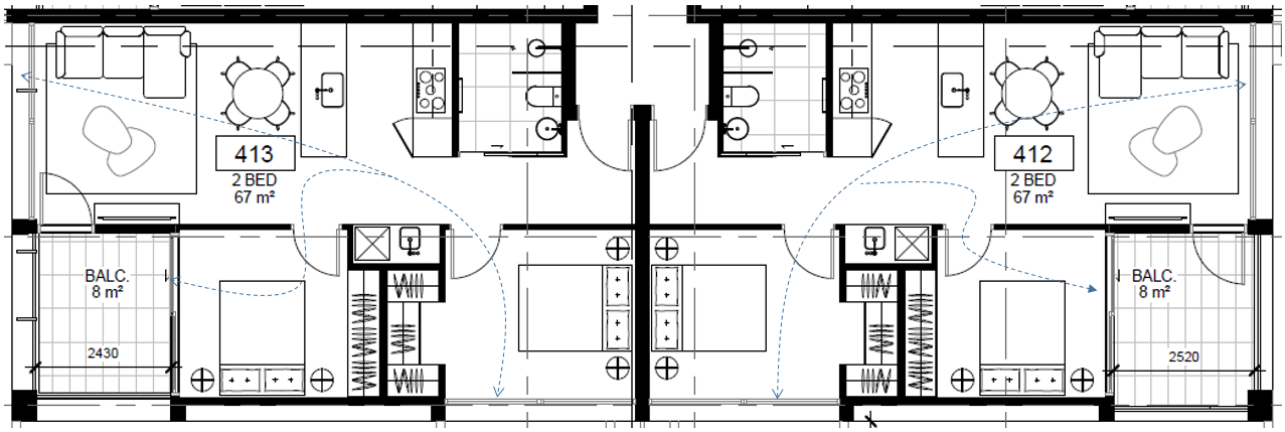


Figure 4: Examples of cross-ventilation pathways through units 412 and 413

2.3 Energy Efficiency

The High Street Road development will minimise energy use through a superior building envelope, efficient central hot water systems, efficient heating & air conditioning and lighting for each unit and tenancy.

Design Requirements	Responsibility & Implementation	Project Stage
Building Fabric and Energy Performance (BESS Management 2.2, Energy 1.2)		
The sample energy ratings achieve a weighted average rating of 6.6 stars. A Best Practise average rating of 6.4 stars (112.5MJ/m^2) will be maintained as a minimum for building approval to demonstrate best practise ESD principles. These results are achieved with the nomination of appropriate building fabric elements that are outlined within the preliminary sample energy report provided as Appendix 1. During the building construction stage of the project, energy modelling will be undertaken for the ground floor tenancies. An improvement on minimum energy efficiency, using a BCA JV3 modelling process will be targeted.	Architect	Design Development
Heating and Cooling Systems		
Heating and cooling in the units and ground floor tenancies will be provided with energy efficient air conditioners (within one star energy rating of the best available; COP>3.5).	Services Consultant	Design Development
Domestic Hot Water (BESS Energy 3.2)		
Hot water for the development will be provided via central condensing gas boiler with a minimum 90% efficiency. All delivery pipework will be suitably insulated.	Services Consultant	Design Development
Indoor Lighting (BESS Energy 3.6 and 3.7)		
Lighting throughout the development will generally be LED and will be designed to achieve a 20% reduction from BCA maximum lighting power densities. This will involve limiting lighting levels to: • 4W/m^2 – units and car park; • 6W/m^2 - common corridors; and • 16W/m^2 – ground floor tenancy areas. Motion sensors will be installed in all areas with sporadic use, such as staff toilets or storage rooms.	Services Consultant	Design Development
Common Area Lighting		
Common area lighting will be LED and will have controls (e.g. light sensors, timers) to minimise consumption during off-peak times (e.g. 11pm-5am).	Services Consultant	Design Development
Car Park Ventilation (BESS Energy 3.1)		
Car park ventilation will be designed to best practice energy efficiency with all exhaust fans being installed with carbon monoxide (CO) sensors so as to make sure they only operate when necessary.	Services Consultant	Construction Documentation
Variable Speed Drives		
Variable speed drives will be installed on all major pumps and fans.	Services Consultant	Design Development
Energy Efficient Appliances		
All appliances provided in the development as part of the base building work will be selected within one energy efficiency star of the best available.	Developer	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
Cooking Appliances		
All units will be provided with an electric oven and gas cooktop.	Architect	Construction Documentation
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 2016 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
PV Panels (BESS Energy 4.2)		
The roof of the development will host a 10.0kW solar PV system (40 x 250W panels) for renewable energy generation. This will offset a portion of greenhouse gas emissions and energy use from central services for the project (lighting, pumps etc.) by producing over 14,600kWh of green electricity per year[2]. A connection for a potential future battery system will be made within the development. In addition, the PV system will help reduce Owners Corporation fees for all members.	Architect / Services Consultant	Design Development

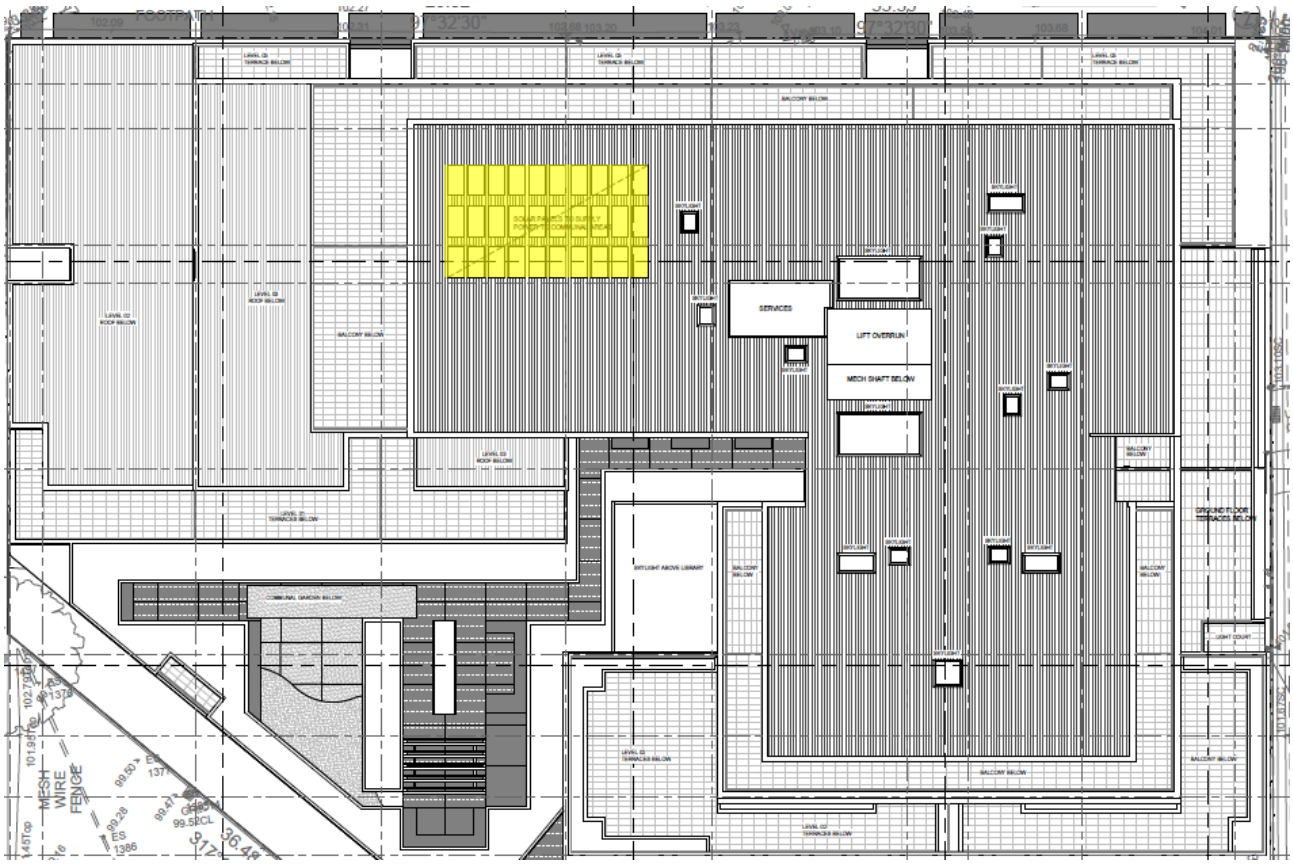


Figure 5: Proposed location of 10.0kw Solar PV System

[2] Calculation based on PV panels generating energy at full capacity for an average of 4 hr/day for the entire year.

2.4 Transport

The High Street Road site has been assessed using the "Walk Score" locational performance tool. The tool was developed in 2007 by Front Seat using the Google Maps tools. This tool takes into account the number of facilities within close proximity and provides a numerical score of between 1 and 100, with 1 being heavily car dependant with access to community facilities that are located some distance away, and 100 reflecting a location that is easily accessible to abundant facilities by foot. The High Street Road development achieves a score of 77 out of 100, which is classified as "Very Walkable." High Walk Scores above 70+ indicate that the building occupants can complete most daily errands without requiring a car.

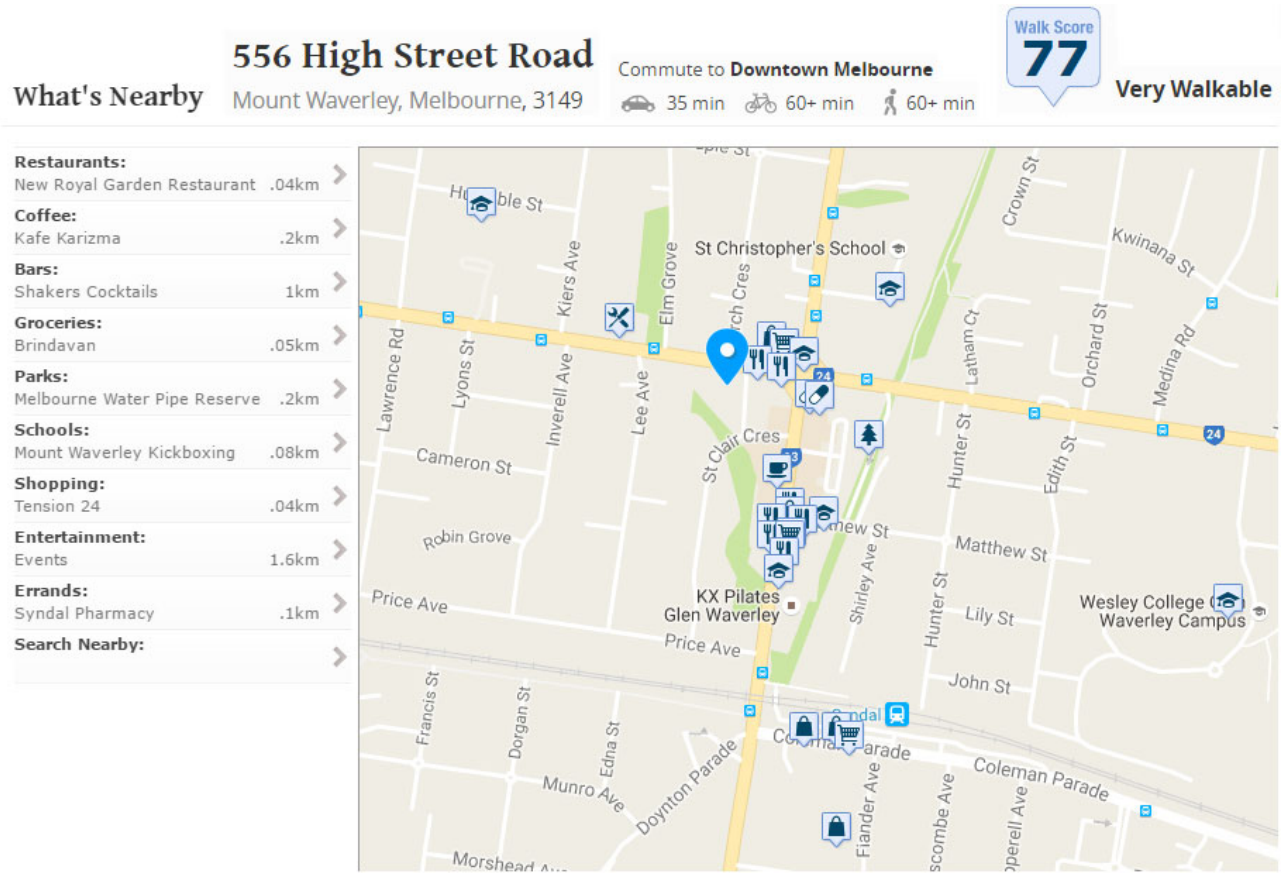


Figure 6: Walkscore and amenities around 554-556 High Street Road, Mount Waverley.

Design Requirements	Responsibility & Implementation	Project Stage
Access to Public Transport		
The High Street Road site has access to a number of public transport options within walking distance. These include Syndal Railway Station (Glen Waverley line) as well as Bus Route No.734 (Glen Iris to Glen Waverley) on High Street Road and Bus Route No.703 (Brighton to Blackburn) on Blackburn Road.	N/A - Inherent in Location	
Active Transport Facilities (BESS Transport 1.1 & 1.2)		
The development site is surrounded by numerous on-road and informal bike routes. 53 bicycle spaces will be provided for the development, located within the basement carpark and ground floor levels. Additionally, 10 spaces will be available for visitors, which will be located within the entry lobby and basement.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
These inclusions will help make cycling more convenient traveling to and from the site which, in turn, encourages people to adopt it as an alternative form of transport to using private motor vehicles.		
Car Parking		
88 retirement village spaces for residents and 5 food and drink parking spaces will be provided in the development.	Architect	Design Development
Electric Car Charing (BESS Transport 2.1)		
Provision for some electric car charging points (power made available) will be provided within the basement car park for residents.	Services Consultants	Design Development

2.5 Water Efficiency & Stormwater Treatment

Water will be used efficiently in the High Street Road development through efficient fixtures and fittings, and collection and use of rainwater which helps to reduce mains water requirements and diverts stormwater.

Design Requirements	Responsibility & Implementation	Project Stage
Water Fixtures and Fittings (BESS Water 1.1)		
The development will reduce its potable water usage through the inclusion of efficient fittings and fixtures to reduce the volume of mains water used. The following Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Toilets – 4 Star; • Taps (bathroom and kitchen) – 5 Star; and • Showerheads – 3 Star (>6.0 but ≤7.5/min).	Architect	Construction Documentation
Rainwater Use & Stormwater Management (BESS Stormwater, Water 2.1)		
Rainwater runoff from the top level roof and terrace areas (1,500m^2) will be diverted to a 50,000L rainwater tank. The tank(s) will be located in the basement with collected water to be used in all toilets located on the basement and ground levels (including retirement village, ground floor tenancy and communal) or equivalent to a usage rate of 1400L/day. The rainwater tank will feature a filtration system to remove suspended solids and gross pollutants and any odours or microbes received from roof or terraces. The tank will also be connected to the irrigation system. These initiatives will greatly reduce stormwater impacts of the development. Please refer to Appendix 3 for more information.	Services Consultant	Construction Documentation
Water Efficient Appliances		
All water-using appliances (e.g. dishwasher) provided in the development as part of the base building work will be selected within one star WELS rating of the best available.	Developer	Design Development
Building Systems Water Use Reduction (BESS Water 4.1)		
When testing fire safety systems, at least 80% of water used will be recycled and restored for use.	Services Consultant	Design Development
Water Efficient Landscaping (BESS Water 3.1)		
Any landscaping featured on site will use water efficiency principles, including low water use plant selection, use of mulch and drip irrigation system. Mains water will not be used for irrigation whenever possible (rainwater use).	Landscape Architect	Design Development/ Construction Documentation

Figure 7: Close up of an inline drip irrigation system on top of a mulched garden bed.

2.6 Building Materials

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

Design Requirements	Responsibility & Implementation	Project Stage
Concrete		
Unless prevented by structural engineering considerations or product unavailability, a minimum of 50% of the concrete mix will contain recycled water (rainwater or purchased recycled water) and 25% of fine aggregate (sand) is to be recycled or manufactured sand (not virgin sand from a quarry).	Builder / Structural Engineer	Construction Documentation
Steel		
Steel for the development will be sourced from a Responsible Steel Maker[3]. Reinforcing steel for the project will be manufactured using energy reducing processes commonly used by large manufacturers such as Bluescope or OneSteel.	Builder / Structural Engineer	Construction Documentation
Joinery		
Plywood or sustainable bamboo should be a preferred solution to MDF and melamine products due to a much better durability and the possibility of re-use after disassembly. The use of post-consumer recycled products such as Ecological Panel (or equivalent) or bio-composite materials such as EcoTop™ will be investigated.	Architect	Construction Documentation
PVC		
All PVC products will meet the Best Practice Manufacturing Guidelines – The manufacturer's facility will be certified ISO14001. This will ensure that the PVC used within the development will have a reduced environmental impact when compared to other products on the market.	Builder	Construction Documentation

[3] 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
Timber		
All timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified, or recycled / reused.	Builder	Construction Documentation

Figure 8: Examples of approved environmental labels which may be incorporated for the development.

2.7 Urban Ecology, Emissions & Innovation

Design Requirements	Responsibility & Implementation	Project Stage
Vegetation (BESS Urban Ecology 2.1)		
At least 10% of the site will be covered in vegetation (including ground floor and upper level planter box landscaping). This will improve the WSUD of the site, as well as the natural aesthetic amenity.	Architect	Construction Documentation
Accessibility Objective (BESS Innovation)		
All units in the development will meet the needs of people with limited mobility.	Architect	Design Development
Light Pollution		
No external luminaire on the project will have an Upward light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation.	Architect	Design Development
Insulation Ozone Depleting Potential (ODP)		
Insulants within the building will be specified to have an Ozone Depleting Potential (ODP) of zero.	Services Consultant	Construction Documentation
Common Roof Terrace (Urban Ecology 1.1)		
A large common courtyard will be implemented for the residents on Level 1. It will be equipped with seating areas to allow residents to interact and relax. Additionally a large communal vegetable garden is being provided to help increase productive planting on site and reduce food miles associated with the development.	Architect	Design Development

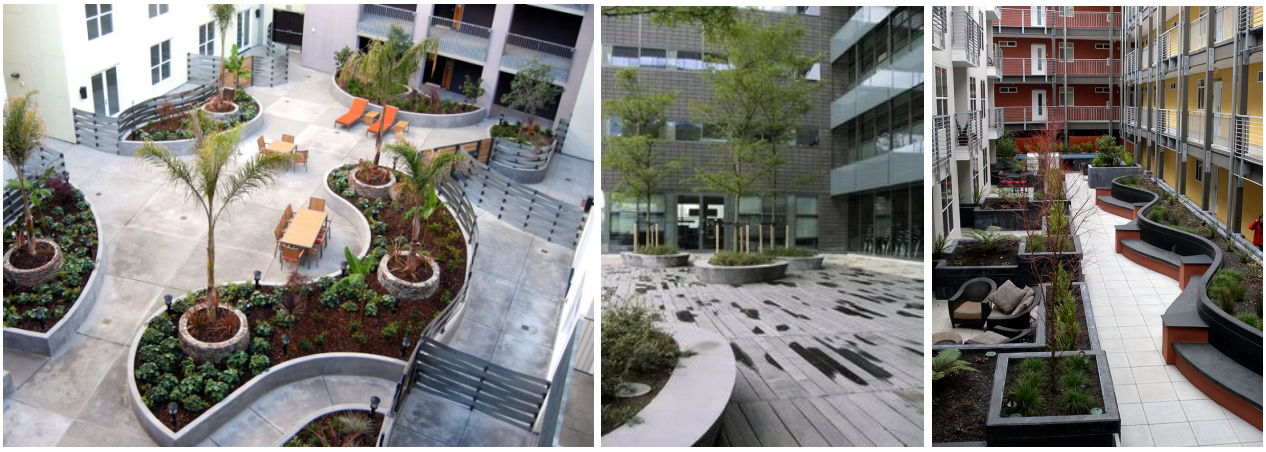


Figure 9: Examples of communal courtyards.

3. Implementation of Initiatives

The proposed High Street Road development will meet the good practice ESD requirements set by the City of Monash through a number of initiatives such as the efficient thermal performance of the buildings' envelope and the reduction in greenhouse gas emissions through the use of efficient air conditioning, the installation of 10kW (min.) of solar PV panels; as well as reduced environmental impact during the construction stage through the specification of sustainable materials and a mindful construction team.

The initiatives that have been included within this SMP have a proven track record to serve their individual purpose and can be easily maintained with any failures generally being obvious to the occupants of the development. This helps to ensure the ongoing sustainability of the development as the systems installed in the beginning are maintained for purpose throughout the life of the development. With appropriate implementation, management, monitoring and maintenance the initiatives outlined within this report will serve to provide the occupants with lower running costs, as well as benefit the surrounding environment of the 554-556 High Street Road, Mount Waverley development with an environmentally and economically sustainable development.

Appendix 1 BESS Assessment

554 High St Rd, Mount Waverley 3149 Mount Waverley

Site area: 2619 m^2 · Building Floor Area: 5850 m^2 ·
Date of Assessment: 13 Dec 2018 · Version: V3, 1.5.1-B157 ·
Applicant: alexander@sdconsultants.com.au

Project number
18340

Published
http://bess.net.au/projects/18340

Your BESS score is

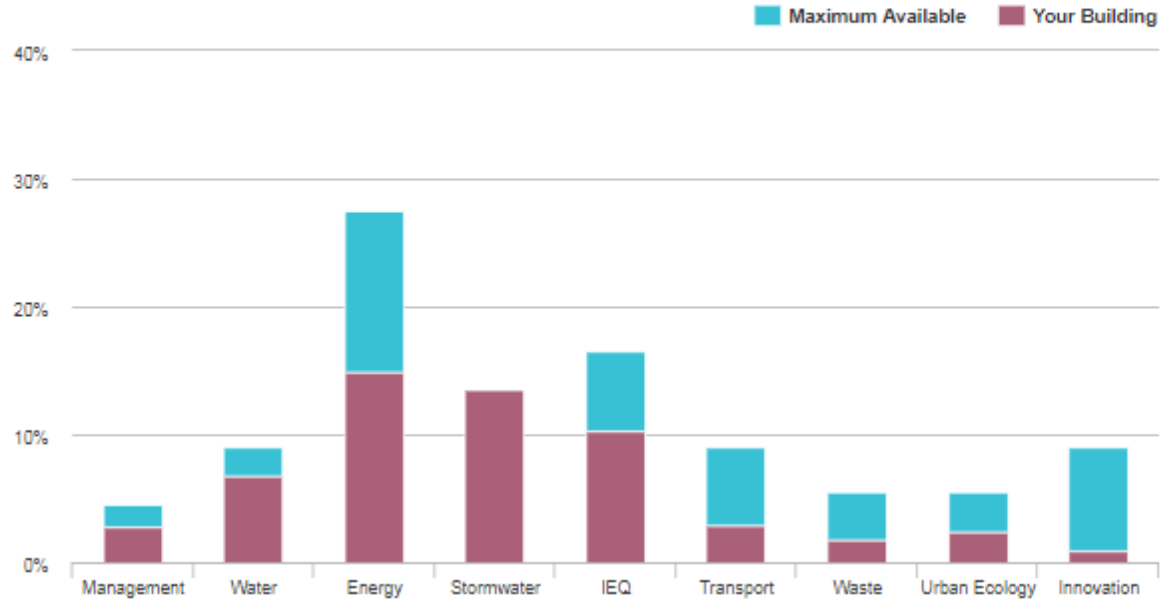
+ 56%

50% +
Best Practice

70% +
Excellence

% of Total	Category	Score	Pass
2 %	Management	60 %	
6 %	Water	75 %	✔
14 %	Energy	54 %	✔
13 %	Stormwater	100 %	✔
10 %	IEQ	62 %	✔
2 %	Transport	32 %	
1 %	Waste	33 %	
2 %	Urban Ecology	44 %	
0 %	Innovation	10 %	

How did this Development Perform in each Environmental Category?



Appendix 2 FirstRate5 Sample Energy Rating Results

The FirstRate energy rating program is the primary modelling method used in Victoria to indicate the required energy for heating and cooling based on the building's thermal envelope. It does not take into account any heating or cooling systems installed; it only assesses walls, roof and floor materials; levels of insulation, building orientation, glazing and the area layout. The 554-556 High Street Road development is located in Climate Zone 62 (Moorabbin) and is required to achieve an average of 6.0 Star (125MJ/m^2) with no unit lower than 5.0 Star as per the Building Code of Australia (BCA) requirement. Developments should aim for a 10% improvement (average ratings of 6.4 stars – 112.5MJ/m^2) for energy rating performance to align with ESD Best Practise principles.

Table 1: The following are the scores achieved by the sample unit assessment of the development.

Unit	Star Rating	Energy Use (MJ/m^2)	Heating Energy (MJ/m^2)	Cooling Energy (MJ/m^2)	Net Conditioned Floor Area (m^2)	No. Thermally Similar Units	Accrued Energy Rating
608	5.2	154.5	128.2	26.3	75.9	8	41.6
605	6.0	124.9	102.1	22.9	71.6	2	12.0
603	6.2	119.7	101.1	18.6	65.3	2	12.4
602	5.3	150.9	129.3	21.6	51.7	2	10.6
507	6.8	98.3	86.4	11.9	64.0	17	115.6
409	6.3	111.3	85.1	28.2	59.1	3	18.9
406	7.9	60.5	43.3	17.3	93.9	6	47.4
301	6.6	103.3	92.1	11.3	67.4	5	33.0
207	8.2	50.8	39.1	11.7	64.6	9	73.8
204	6.9	92.6	79.6	13.1	63.6	11	75.9
105	6.9	93.8	80.2	13.6	60.5	9	62.1
007	5.7	137.0	126.4	10.6	55.8	6	34.2
001	5.5	143.5	131.6	11.9	63.7	3	16.5
Average	6.4	110.9	94.2	16.9	65.9	Weighted Average	6.6

The sample ratings have been completed with the following inputs:

Building Fabric Element	Description
External Walls	All external walls will require an additional R1.7 insulation to be added. Some options include: • CSR Bradford Acoustigard Wall Batts • Knauf Earthwool External Acosutic Wall Batts Insulation material with minimum 20% recycled material content will be selected. The options recommended above go beyond this requirement.
Party Walls	Party walls will require acoustic insulation.
Internal Walls	Internal walls do not require additional insulation.
Floor	Floors are assumed as suspended concrete slab. Additional R1.2 insulation is to be added when the floor is located above the car park or an open space.

Building Fabric Element	Description
Floor Coverings	Floor coverings are assumed as carpet for bedrooms, tiles for bathrooms / ensuite and floating timber for the living room and kitchen.
Roof Insulation	Roofs between levels have been modelled as suspended slabs and will need an additional **R2.0** added insulation where located under a balcony/terrace. Some options include: • CSR Bradford Gold Ceiling Batts (R2.0) • Knauff Earthwool Ceiling Batts (R2.0) Top roofs have been modelled as Suspended Slab and will require R4.0 insulation to be added. Some options include: • CSR Bradford Gold Ceiling Batts (R4.0) • Knauff Earthwool Ceiling Batts (R4.0)
Windows and Glazing	**Unit 608** Awning / Casement windows are required to have window system thermal performance values of: **Glazing Properties - U value = 4.1, SHGC =0.47** Fixed and sliding windows are required to have window system thermal performance values of: **Glazing Properties - U value = 4.1, SHGC =0.52** These values are commonly found in clear double glazed argon filled windows with aluminium frames and low-e glass. **All Remaining Units:** Awning / Casement windows are required to have window system thermal performance values of: **Glazing Properties - U value = 4.5, SHGC =0.50** Fixed and sliding windows are required to have window system thermal performance values of: **Glazing Properties - U value = 4.5, SHGC =0.61** These values are commonly found in clear double glazed argon filled windows with aluminium frames.
Building Sealing	All doors, windows, exhaust fans and openings will be sealed so as to not allow for air infiltration into the units.
Downlights	All recessed down light fittings that have openings allowing air to pass through to a ceiling cavity (e.g. Adjustable down lights) shall be fitted with a cover that allows for ceiling insulation to closely enclose the sides and top of the down light.

Note: The above building elements may vary as the plans are refined for building approval, however the average building energy rating performance of 6.4 Stars (112.5MJ/m^2) will be maintained as a minimum.

** *Please note that at the time of the assessment most window dimensions and types were not specified, thus worst case assumptions have been made. This will be refined once more information is available.*

Appendix 3 Stormwater Management

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 off the impervious surfaces into the stormwater drains.

The City of Monash has recognised the importance of managing stormwater flow and water quality. As a result, a local planning policy, Clause 22.04 "*Stormwater Management Policy",* has been introduced into the City of Monash Planning Scheme.

The relevant objectives that form part of the Stormwater Management Policy include:

- To minimise the introduction of polluted stormwater to the drainage and waterway system.
- To promote and enhance the contribution the drainage system can make to environmental, social and economic benefits to the region.
- To encourage the provision of on-site retention systems so that stormwater discharge is maintained at pre-development levels.

New developments must also 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 and amount of stormwater leaving the site. To assess these initiatives, the Melbourne Water STORM tool – which is an industry accepted tool – was used to determine the treatment effectiveness of these initiatives.

Stormwater Management Initiatives

Stormwater treatment initiatives will need to be implemented. Table 1 presents the different surfaces that have been identified for treatment, and the required treatment. The initiatives to manage stormwater flows for the building area will underpin the overall performance of the building and its ability to meet stormwater management objectives.

Table 1: List of areas and their stormwater treatment measures.

Surfaces	Mark	Topographic Area (m^2)	Required Treatment
Roof Catchment Area		1,500	Runoff to be diverted to a rainwater tank(s) with an effective storage capacity of 50,000L for the development. The stored water is to be used for toilet flushing in communal areas, ground floor tenancies as well as units located on the basement and ground floor within the development or equivalent to a usage rate of 1400L/day. Irrigation system will also be connected to the tank.
Permeable Areas		297	Runoff is assumed to permeate through the soil, where suspended solids and nutrients will be retained by the media and vegetation.
Remainder of site	Unmarked	822	Runoff from the remainder of site and any overflow from the above mentioned treatment measures will be directly released at the legal point of discharge.

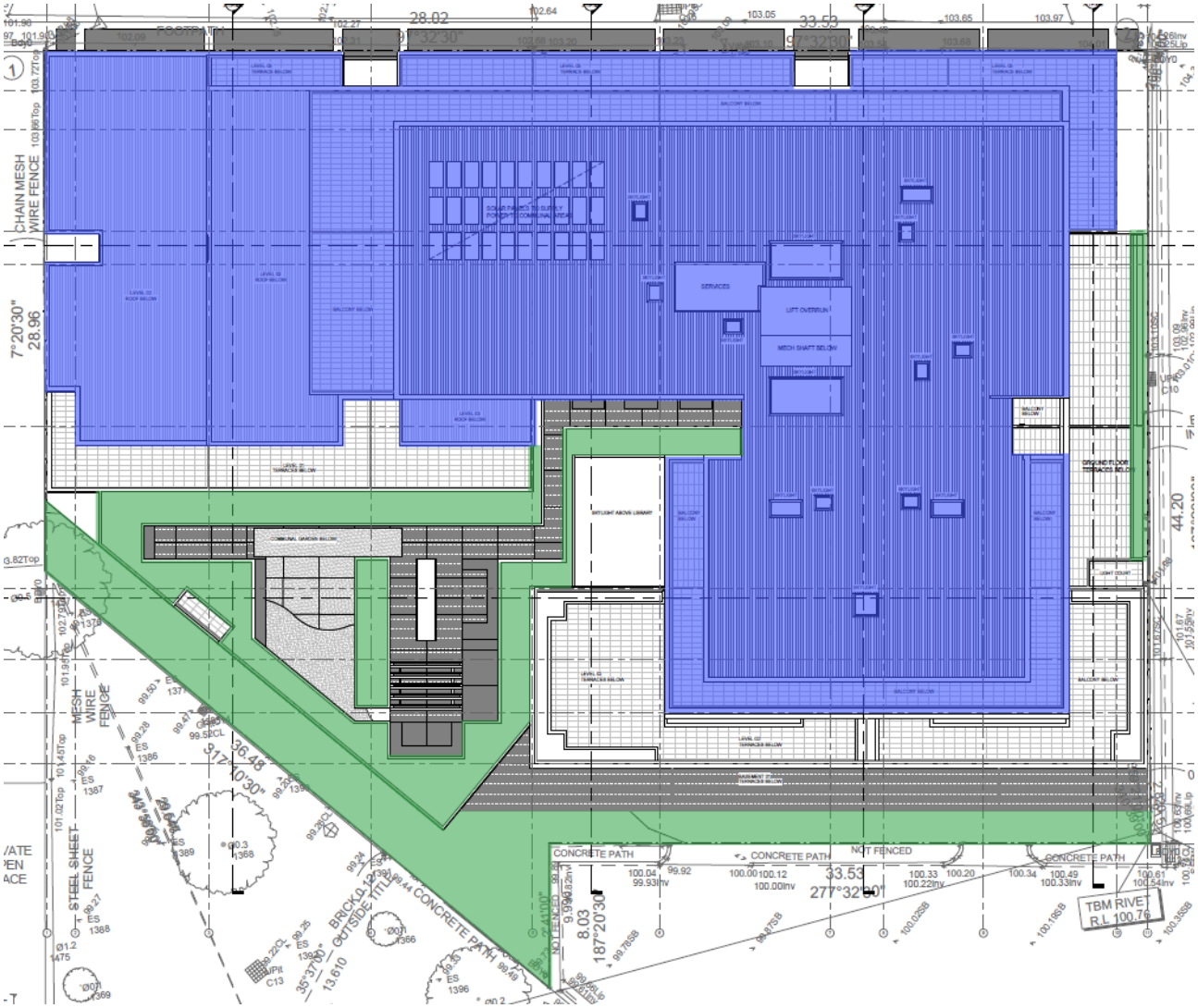


Figure 10: Site Delineation

Stormwater Quality Modelling Results

The impervious surfaces and recommended treatments have been applied to the STORM tool and as a result, the proposed development achieves a score of 101%. With the proposed stormwater treatment measures incorporates into the development at 554-556 High Street Road, Mount Waverley, the design will meet the minimum performance standards required by the City of Monash.

STORM Rating Report

TransactionID:	660684
Municipality:	MONASH
Rainfall Station:	MONASH
Address:	554 - 556 High Street Road
	Mount Waverley
	VIC 3149
Assessor:	
Development Type:	Residential - Mixed Use
Allotment Site (m2):	2,619.00
STORM Rating %:	101

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof Collection Area	1,500.00	Rainwater Tank	50,000.00	70	156.60	81.00
Remaining Impervious Surfaces	822.00	None	0.00	0	0.00	0.00

Figure 11: STORM modelling results

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[4]. 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

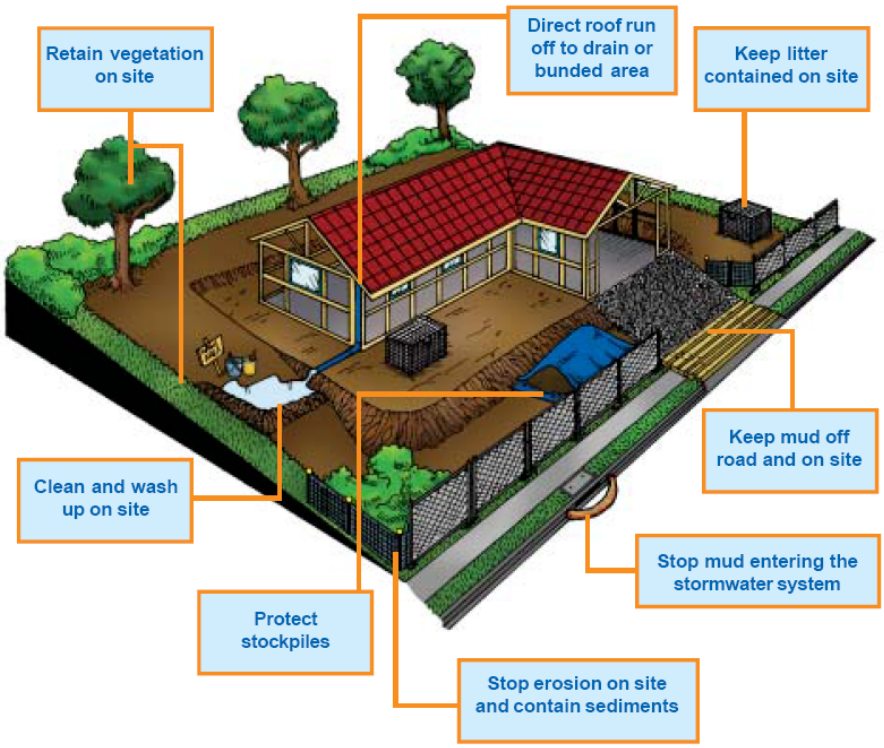
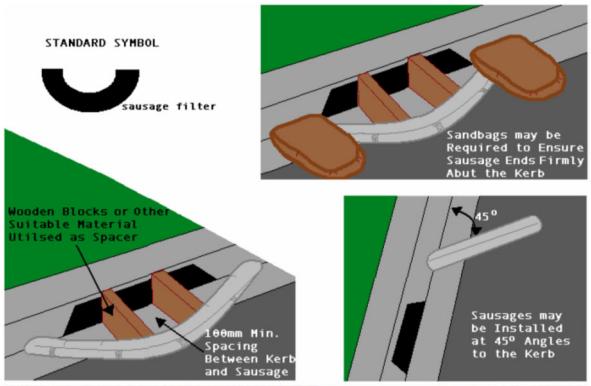


Figure 12: Stormwater will be effectively managed during construction phase according to the requirements listed in "Keeping Our Stormwater Clean – A Builder's Guide".

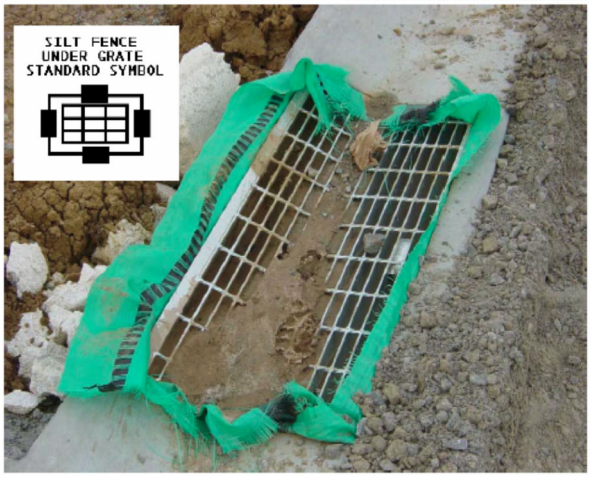
To reduce the impacts and minimise the generation of these pollutants the following measures are proposed. The symbols embedded within each image are typically used for Construction Environmental Management Plans.

[4] 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 streets where it can be washed (by rainfall or other means) into the stormwater drains.

Conclusions and Recommendations

With the implementation of rainwater tank storage system for the roof runoff, the overall flow from the site during rainfall events have been significantly reduced. Overall the development has reduced the outflows and improved quality of stormwater runoff from the site significantly compared to the pre-development conditions

The builder will also be required to adhere to Melbourne Water's stormwater management guidelines during the construction stage.

Appendix 3 VOC and Formaldehyde Emissions Limits

Table 2 Maximum Volatile Organic Compound Levels for construction materials. (Source: Green Building Council Australia – Green Star Multi-unit Residential v1.2 2017 Manual)

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/m^2 per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m^2 per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m^2 per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5 mg/m^2 per hour

Table 3 Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Multi-unit residentialv.1.2 2017 Manual)

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/m^{2}hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m^{2}hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m^{2}hr (at 3 days)
ASTM D6007	≤0.12mg/m^3
ASTM E1333	≤0.12mg/m^3
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m^3
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m^{2}hr

Appendix 4 Daylight Modelling Advice

Sustainable Development Consultants have modelled the design of the proposed retirement village development at 554 High Street Road, Mount Waverley using the 3D modelling program Autodesk Ecotect Analysis 2011 and the Radiance plugin.

The design has been assessed against the desired daylight levels outlined under the SDAPP[5] Indoor Environment Quality guidelines. For dwellings, these levels have been defined as:

- ≥0.5% daylight factor achieved across at least 90% of the floor area for bedrooms; and
- ≥1.0% daylight factor achieved across at least 90% of the floor area for living areas (including kitchens).

These values have typically been accepted by councils and VCAT as being appropriate for the purposes of determining good daylight access. Monash City Council will look to ensure the project meets these requirements for a high percentage of dwellings (typically in excess of 80% as a minimum).

The modelling has been undertaken in the current surrounding conditions which are considered likely to be maintained into the future due to the development potential of the surrounding sites within direct contact to the proposal.

Design and Performance

The development has been modelled in detail with the internal walls and windows built into the model for the selected retirement village units modelled. All elements that could overshadow or reflect light into the subject bedrooms and living rooms are deemed important for the assessment and were included in the model.

All glazing was modelled as standard clear double glazing with a VLT of 65%.

The floors were modelled with a reflectivity of 0.3 (30%) as is typical for carpet or darker timber flooring; the balconies were modelled with a reflectivity of 0.4 (40%).

Ceilings were assumed as white with a reflectivity of 0.7 (70%).

The external walls were modelled with a reflectivity of 0.5 (50%) and the internal walls modelled as having a reflectivity of 0.7 (70%).

All window and glazed door sizes and locations are modelled as measured from the provided floor plans and elevations. Only the vision glazing has been modelled.

Balcony balustrades have been modelled as 1m high except where required to be higher for privacy reasons such as between dwellings. In these instances balustrades were modelled as being 1.7m high. Balustrades were modelled as 25% permeable / visual light transmission.

The modelling was undertaken using a uniform design sky which is used to generate daylight factors across the spaces being tested for compliance.

Please see the results of the modelling below for confirmation of the predicted daylight factors within the development and an analysis of the appropriateness of the design to provide good internal daylight amenity and energy efficiency (i.e. not relying on artificial lighting during the day).

In the results below, please note that common areas, wardrobes, bathrooms and corridors have been removed from the results for clarity.

Results

The figures below have the following colour scale:

- Yellow; over 1% daylight factor (acceptable daylight in bedrooms and living rooms);
- Red through to dark yellow; 0.5%-1% daylight factor (acceptable daylight in bedrooms, only acceptable in living zones if small amounts present); and

[5] SDAPP – Sustainable Design Assessment in the Planning Process.

- Blue through to purple; <0.5% daylight factor (typically unacceptable in living zones, small amounts acceptable in bedrooms).

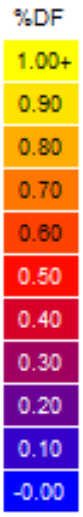


Figure 13: Colour scale of the daylight factors presented in the results below

Figure 14: Daylight modelling results for the Basement Level retirement village units

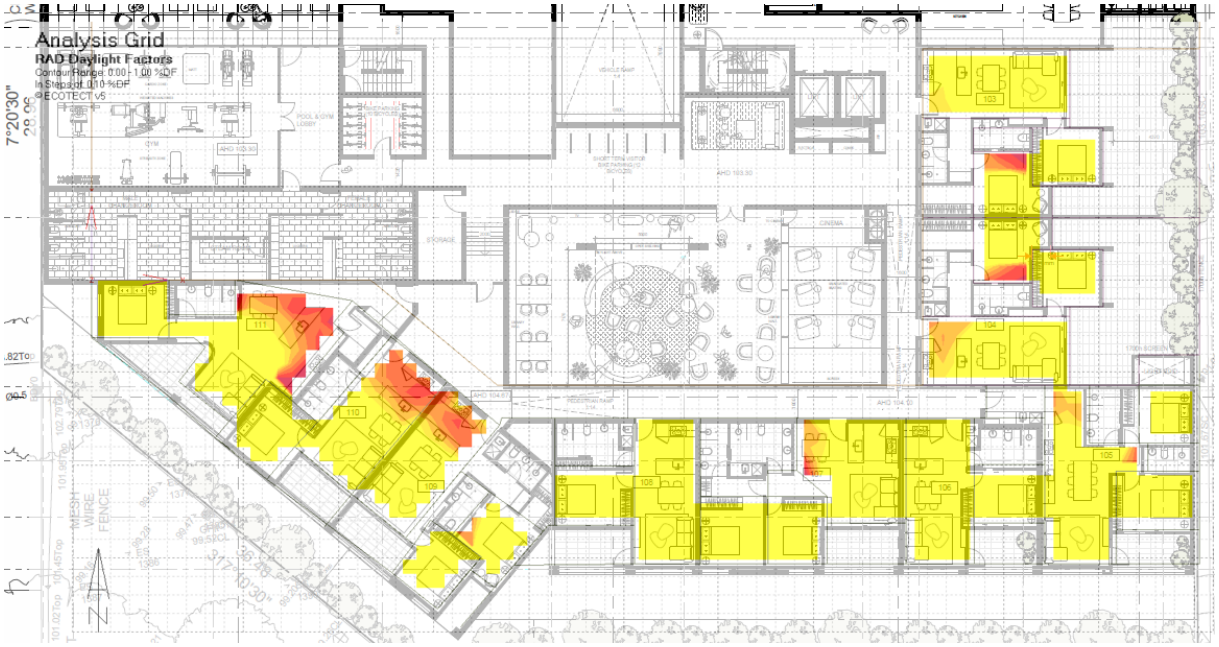


Figure 15: Daylight modelling results for the Ground Floor retirement village units

Figure 16: Daylight modelling results for the Level 1 main types of retirement village units

Figure 17: Daylight modelling results for the Level 2 main types of retirement village units

Analysis of Investigation

Living Rooms

There have been a few unit types which are demonstrated to fall below the desired daylight levels. However, the modelling has positively demonstrated that the predominant unit types are performing well for provision of daylight to the living zones. The primary unit types facing north and south (2 bedroom and 1 bedroom) both meet the best practice daylight levels (as outlined in figure 4 and 5).

The unit types which have been modelled to not meet the best practice daylight levels for living zones is the south west facing retirement village units (005, 006 and 007 and those above) which have the kitchen area falling below the best practice daylight level.

Finally, the other unit which has been modelled to fall below the best practice daylight level is 104 (east facing). This unit has an obstruction in front of the living zone window. The design is acceptable and not proposed to be changed as the units above and next to it will perform adequately as demonstrated by the results for unit 103.

Overall it is predicted that the development will have 7 retirement village units fall just short of the best practice daylight levels for living zones. This represents 8% of the retirement living units. As such the living zones are considered to be acceptable for the purposes of daylight provision for good internal amenity and are awarded points in the BESS tool.

Bedrooms

All bedrooms are modelled to be provided with over 0.5% daylight factor for over 90% of the floor area. Thus 100% of the bedrooms will meet the desired daylight level and therefore be awarded full points in the BESS tool.

Summary

Overall, the project performs well with 92% of living zones and 100% of bedrooms modelled to meet the SDAPP IEQ Daylight requirements for best practice internal daylight amenity.