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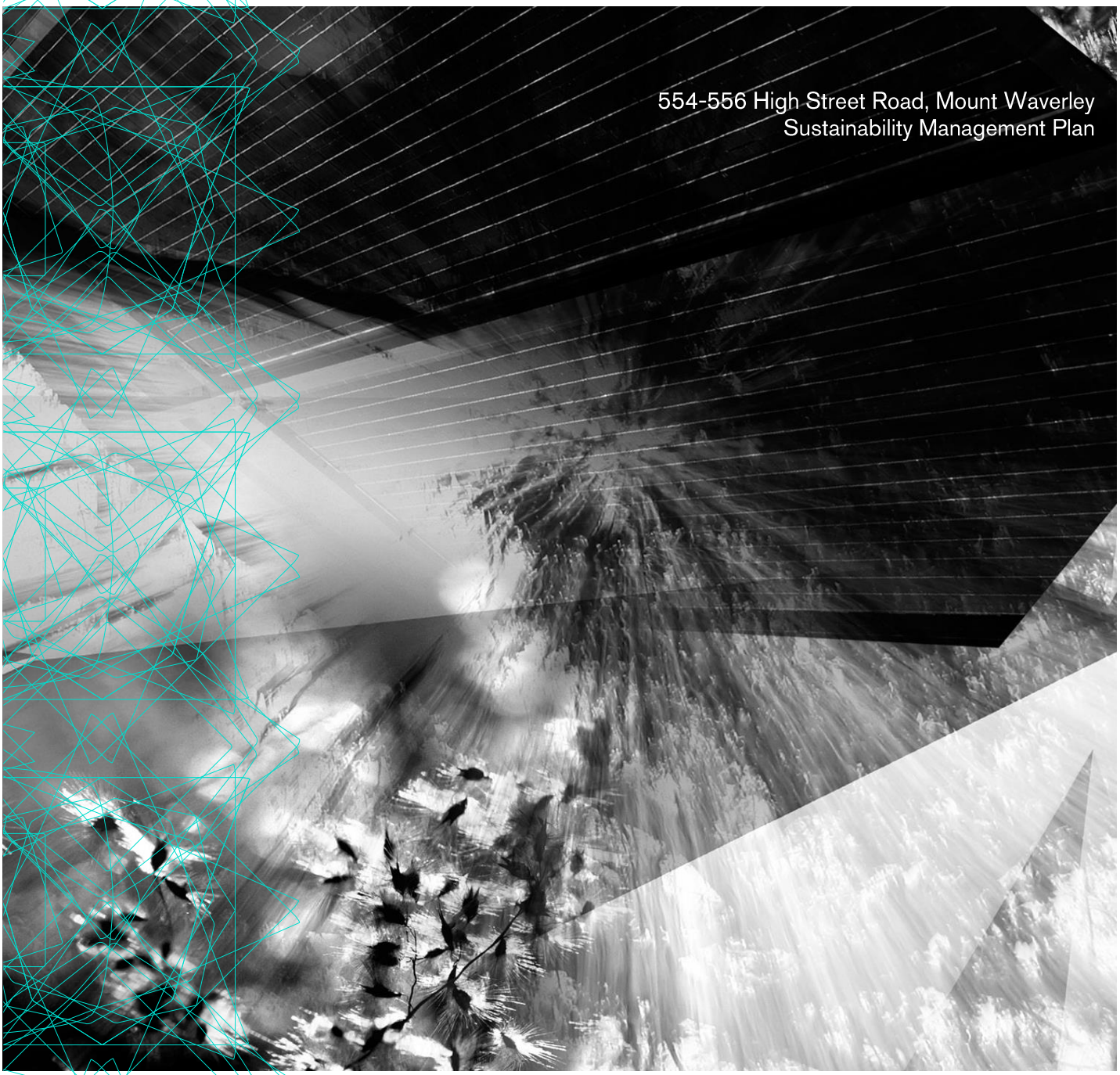

554-556 High Street Road, Mount Waverley
Sustainability Management Plan

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

Sustainability Management Plan (SMP)

October 2021

S2781 SMP.V4

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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
V3	23-11-2020	For Submission	TJ	LR
V4	27-10-2021	For Endorsement	JB	LR/BdW

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 was occupied by various commercial buildings such as a fitness centre, a yoga studio and a used car dealer, which have been demolished prior to enable the construction of the proposed 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 six-storey mixed use building containing 97 retirement village units above a basement garage, on the ground floor there are communal amenities for residents such as a communal lounge and activity room.

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	97 Units (56 x one-bedroom, 40 x two-bedroom and 3 x three-bedroom)
Amenities	Activity Room, Communal Lounge, Meeting Room
Parking	75 retirement village car spaces, 46 bicycle spaces

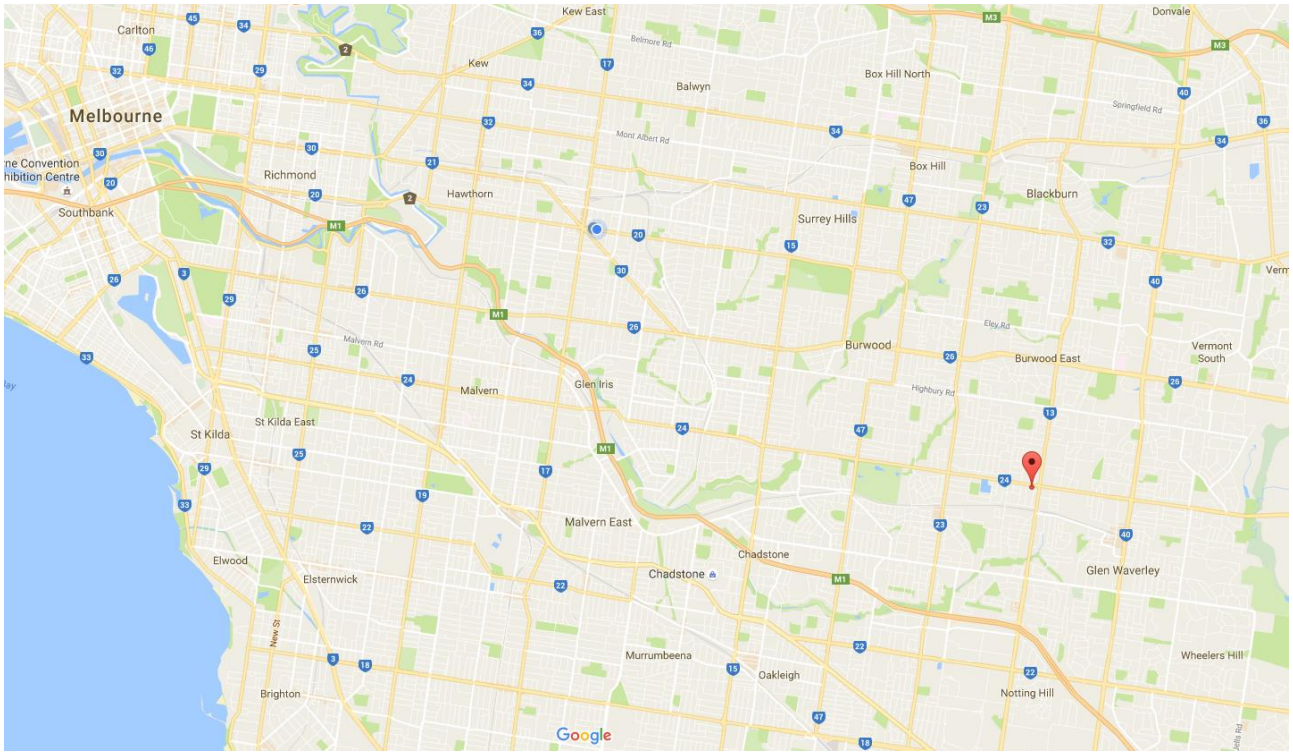


Figure 2: The red balloon shows the location of 554-556 High Street Road, Mount Waverley (Source: Google).

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:

- EnviroDevelopment 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 EnviroDevelopment tool is typically used to demonstrate that a development meets best practice sustainability benchmark requirements in line with the tool created by the UDIA.

1.3.1 ENVIRODEVELOPMENT TOOL

The EnviroDevelopment Assessment tool is designed by the Urban Development Institute of Australia (UDIA). EnviroDevelopment is an assessment scheme that independently reviews development projects and awards certification to those that achieve outstanding performance across four or more of the provided elements – Ecosystems, Waste, Energy, Materials, Water, and Community. The High Street Road project is pursuing EnviroDevelopment certification, and the initiatives underpinning this are used to align with Monash's SDAPP Categories.

Figure 3: EnviroDevelopment Logo showing different "Leaves" or Elements

1.3.2 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 2019 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 2.

2. Sustainability Initiatives

The following sections outline the initiatives that will be incorporated into the development throughout design, construction and operation. Initiatives that are included to meet EnviroDevelopment Seniors Living certification requirements have a reference next to them, e.g. 'ED 1.2.1'. Some initiatives without the EnviroDevelopment 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 Ecosystems

The ecosystem element of EnviroDevelopment certification addresses initiatives that protect and enhance native ecosystems and ecological function and rehabilitate degraded sites. Initiatives in this category will address Council's objectives for urban ecology and stormwater management.

Design Requirements	Responsibility & Implementation	Project Stage
Aquatic Ecosystems (ED 1.1) **Stormwater Management (ED 1.1.1)**		
Stormwater management considerations are included in Appendix 3. The stormwater management incorporates: • Integrated water cycle management principles; • Appropriate drainage to protect both water cycle and infrastructure; and • Adequate stormwater management provisions both during and post construction.	Hydraulic/ Civil Engineer	Design Development

[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

Design Requirements	Responsibility & Implementation	Project Stage
Herbicide or Pesticide Use (ED 1.1.2)		
Herbicide or pesticide use will be minimised by: • Considering alternative pest/weed control measures; • Ensuring that any use of herbicides or pesticides can be undertaken safely, with conservation benefit outweighing risk of harm; and • Considering potential environmental impacts.	Building Manager	Operation
Soil Health (ED 1.2, 1.2.1, 1.2.2, 1.2.3, 1.2.4., 1.2.5)		
The following measures will be implemented to ensure construction practices retain the ecological integrity of the soil: • Taking soil samples in areas to be planted out to ensure an understanding of soil characteristics; • Retain, or stockpile and use topsoil from the site; • Minimise compaction of topsoil; • Recycle and reuse any vegetative debris on site (for compost, mulch); and • Amend, mulch and revegetate soils disturbed during construction.	Builder	Construction
Earthworks (ED 1.3, 1.3.1, 1.3.3)		
The following measures will be implemented to reduce the impact of construction works: • Conduct analysis to identify potential soil issues, suitability of the site for earthworks etc; and • Implementation of effective erosion and sediment control measures during construction (see Appendix 3).	Builder	Construction Documentation
Urban Ecology (ED 1.4, 1.4.1, 1.4.2)		
Environmental weeds will not be incorporated into landscaping works.	Landscape Architect	Design Development
The urban heat island effect will be reduced by: • Inclusion of planted areas; • Light-coloured roofing; and • Inclusion of solar panels.	Architect	Design Development
High Density Projects Requirement (ED 1.4.23, 1.4.27, 1.4.28, 1.4.29, 1.4.30)		
The project addresses these requirements by: • Locating on a significantly modified site; • Including podium planting, incorporating native plants, designed to improve ecological function; • Incorporating community and productive gardens; • Demonstrating that the planting palette includes fast and slow growing species; and • Incorporating a tap and floor waste on balconies to encourage residents to include and maintain vegetation.	Architect/ Landscape 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

Design Requirements	Responsibility & Implementation	Project Stage
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

2.2 Waste

The waste element of EnviroDevelopment certification addresses waste management procedures and practices to reduce the amount of waste to landfill and facilitate recycling. Initiatives in this category will address council's objectives for waste management.

Design Requirements	Responsibility & Implementation	Project Stage
Construction Waste (ED 2.1.1, 2.2.1, 2.2.2, 2.2.3, 2.2.4)		

The following construction waste initiatives will be implemented:
• Local recyclers, secondary product manufacturers, and material streams available to the site will be identified to be used in the pre-construction and construction phase.
• A waste management plan will be prepared that includes the following:
  ○ Waste generation;
  ○ Waste systems;
  ○ Minimisation strategy;
  ○ Performance/reduction targets;
  ○ Bin quantity and size;
  ○ Collection frequency;
  ○ Bin storage;
  ○ Waste collection;
  ○ Waste contractors; and
  ○ Signage.
• A minimum of 80% (by volume) of demolition, land clearing and civil works materials/ products (including vegetative debris) on site, and construction waste will be recycled or reused. In the event that these materials cannot be recycled, full details of the operators to be engaged and material streams to be recovered as part of the off-site activity will be provided (hazardous materials will be excluded from this commitment).
• All hazardous substances, pollutants and contaminants will be managed, disposed/treated in accordance with all state regulatory requirements.
• Guidance regarding waste practices will be provided for builders working on site. This will include the use of skip bins rather than cages, maintenance of waste records, use of contractors who transport waste to a licensed recycling centre, selection of materials and products which minimise and/ or recycle packaging, and the design of dwellings to maximise the use of standard sizes of materials wherever possible.
	Developer/ Builder/ Landscape Contractor	Construction Documentation/ Construction

Design Requirements	Responsibility & Implementation	Project Stage
Operational Waste (ED 2.3.4)		
Dedicated storage for the separation, collection and recycling of waste will be provided and be easily accessible to all building occupants. This will include 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.	Developer/ Owners Corporation/ Building Manager	Design Development/ Construction/ Post Occupancy

Figure 4: Examples of kitchen waste bins incorporated into joinery.

Separate meters (water, hot water, gas 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**
Building User Guide		
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).	Services Contractor	Construction Documentation

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.		

2.3 Energy

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
Climate Responsive Design (ED 3.1.1, 3.1.2, 3.1.3)		
The project has been designed to minimise adverse conditions, including negative microclimatic factors by: • Designing to achieve high energy ratings, that also minimise heating and cooling loads, demonstrating that the units are well designed for hot and cold weather; and • Offering open space opportunities with different aspects, shady and sunny spaces and weather protection.	Architect	Design Development
Common Area Lighting (ED 3.2.1)		
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
Glazing (ED 3.3.1)		
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
Car Park (ED 3.4.1, 3.4.2)		
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. Passive supply or passive exhaust opportunities will be incorporated wherever practical.	Services Consultant	Construction Documentation
Lift Systems (ED 3.5.1)		
Lifts will be installed that are energy efficient and environmentally friendly. Lifts will include features such as: • Use of regenerative drives; • Machine room-less elevators; • Dispatch control systems; • Intelligent automation; and/or • Stand-by modes.	Services Engineer	Construction Documentation
Building Fabric and Energy Performance (ED 3.6.7)		
Preliminary NatHERS ratings have been completed for a sample of units which demonstrates the ability of the design to achieve an average energy rating of at least 7 Stars for the development, which exceeds the minimum that is required under NCC 2019 BCA. This is achieved with a choice of energy efficient building fabrics (e.g. double glazing with energy efficient frames) which are outlined within the preliminary energy report provided in Appendix 1.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Heating and Cooling Systems		
Heating and cooling in the units and ground floor tenancy will be provided with energy efficient air conditioners (within one star energy rating of the best available; COP>3.5).	Services Consultant	Design Development
Hot Water (ED 3.6.2)		
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		
Energy consumption from artificial lighting within the units will be reduced by using LED lighting and by optimising the daylight diffusion. A lighting level of 4.0 W/m² will not be exceeded. It is recommended that lighting levels will not exceed the maximum wattages listed in Table J6.2a of the 2019 BCA without the use of any adjustment factor.	Services Consultant	Design Development
Variable Speed Drives		
Variable speed drives will be installed on all major pumps and fans.	Services Consultant	Design Development
Clothes Drying (ED 3.7.1)		
Where clothes dryers are installed in units, the energy rating must have a consumption of ≤175kWh per annum.	Developer	Construction Documentation
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
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 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
PV Panels		
The roof of the development will host a 10.0kW solar PV system (30 x minimum 335W panels) for renewable energy generation. Panels will be located on the Level 3 roof on the western side of the site. This will offset a portion of greenhouse gas emissions and energy use from central services for the project (lighting, pumps etc.) by producing over 13,030.5**kWh** 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

[2] Annual solar power energy generation as estimated in BESS

2.4 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 4. 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		
All living areas, bedrooms and ground floor spaces 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. A light court provides daylight into the ground floor communal lounge / activity rooms and meeting room. 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
Effective Natural Ventilation		
The units 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	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
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.		

2.5 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.

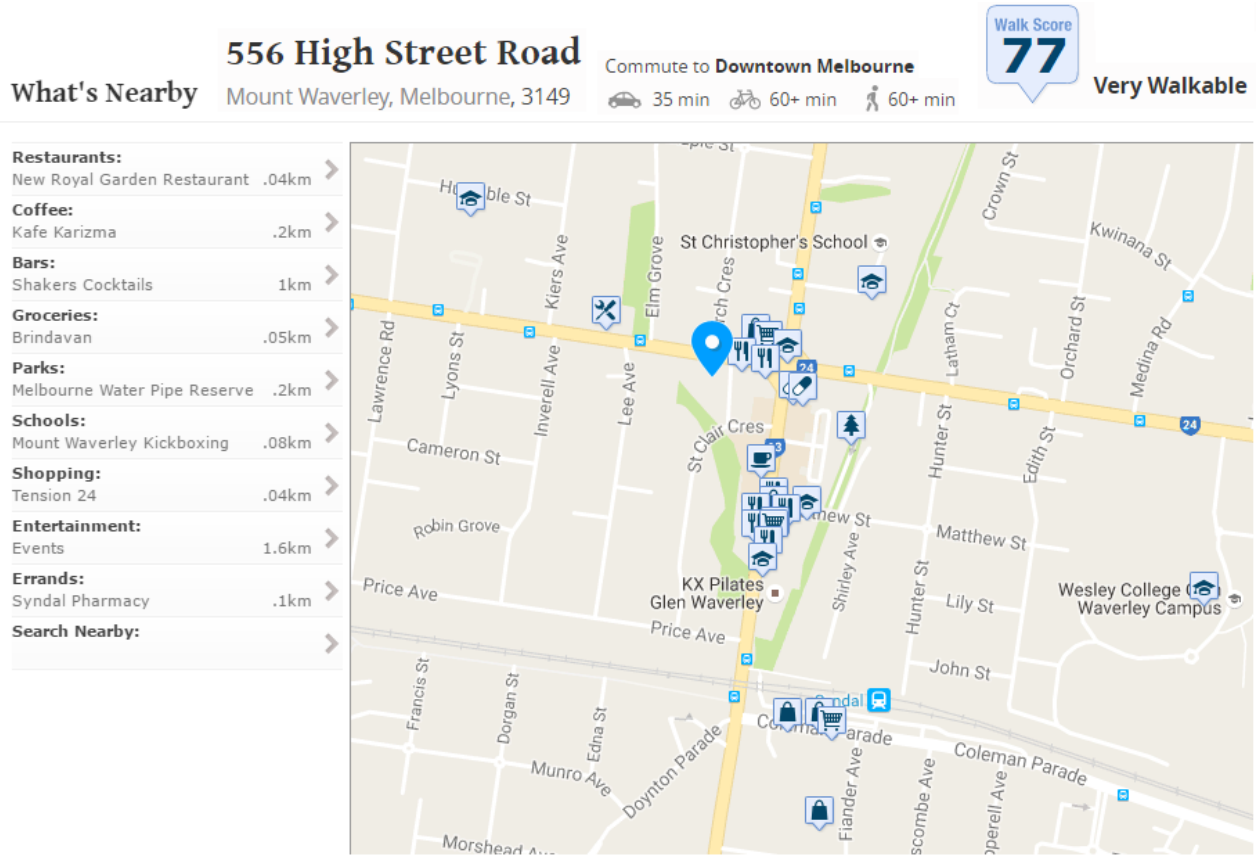


Figure 4: Walkscore and amenities around 554-556 High Street Road, Mount Waverley.

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	N/A - Inherent in Location	

Design Requirements	Responsibility & Implementation	Project Stage
Waverley) on High Street Road and Bus Route No.703 (Brighton to Blackburn) on Blackburn Road.		
Active Transport Facilities		
The development site is surrounded by numerous on-road and informal bike routes. 46 bicycle spaces will be provided for the development, located within the basement carpark and ground floor levels. 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.	Architect	Design Development
Car Parking		
75 retirement village spaces for residents will be provided in the development.	Architect	Design Development

2.6 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 (ED 5.1.4)		
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 (ED5.1.3)		
Rainwater runoff from level 2 roof and all roof/terrace areas above that (1,523.4^2) will be diverted to a 52,000L rainwater tank(s). The stored water is to be used for toilet flushing in communal areas, ground floor spaces as well as units located on the basement up to and including level 3 of the development. 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 2 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

Design Requirements	Responsibility & Implementation	Project Stage
Building Systems Water Use Reduction		
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		
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 5: Close up of an inline drip irrigation system on top of a mulched garden bed.

2.7 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

[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
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
Cables, pipes, floors and blinds		
All standard uses of cables, pipes, flooring and blinds within the building will either not contain any PVC or will be sourced from a manufacturer/ supplier who adheres to the Green Building Council of Australia's *Best Practice Guidelines for PVC in the Built Environment.*	Builder	Construction Documentation
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 6: Examples of approved environmental labels which may be incorporated for the development.

2.8 Urban Ecology, Emissions & Innovation

Design Requirements	Responsibility & Implementation	Project Stage
Accessibility Objective		
All units in the development will meet the needs of people with limited mobility.	Architect	Design Development
Common Roof Terrace		
A large common courtyard and garden will be implemented for the residents, located on Level 2 of the development. It will be equipped with seating areas to allow residents to interact and relax. Additionally, a large communal terrace is being provided at roof level with cooking and seating areas.	Architect	Design Development

Figure 7: 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 in the development enable a 4 Leaf EnviroDevelopment standard to be achieved.

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 FirstRate5 Sample Energy Rating Results

The FirstRate5 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, insulation, building orientation, glazing and the area layout.

The 554-558 High Street Road, Mount Waverly development is located in Climate Zone 62 (Moorabbin) and is required by the 2019 Building Code of Australia (BCA) to achieve a minimum average energy rating of 6 Stars (125MJ/m^2) for the development with no unit rating lower than 5 Stars (165MJ/m^2). The following BCA 2019 heating and cooling load limits will also apply for the development: heating load limit of 109MJ/m^2 and cooling load limit of 26MJ/m^2, with no individual dwelling exceeding a heating load of 147MJ/m^2 and a cooling load of 37MJ/m^2.

Additionally, a cooling load of <21MJ/m^2 is required for by Clause 55.07-1 Standard B35 of the Monash City Council Planning Scheme.

To facilitate the energy rating assessment, the development has been grouped into thermal groups as shown in the following table:

Table 1: Thermal groups and justification

Sample Dwelling	Thermally Similar	Justification	Star Rating
B01	G03	Same orientation, similar layout and exposed sides	6.4
B05	G07 & 117	Same orientation, similar layout and exposed sides	6.7
B11	G13	Same orientation, similar layout and exposed sides	6.3
G01	G02, 111,112,211,212	Same orientation, similar layout and exposed sides	8.6
G04	B02-B04, G05-G06, 114-116,214-216,312-314	Same orientation, similar layout and exposed sides	8.3
106	G15-G17, 107-110 & 206-210	Same orientation, similar layout and exposed sides	8.5
118	B06-B08, G08-G10 & 119-120	Same orientation, similar layout and exposed sides	6.6
121	B09-B10, G11-G12 & 122	Same orientation, similar layout and exposed sides	7.3
205	G14 & 105	Same orientation, similar layout and exposed sides	7.5
218	217, 315 & 316	Same orientation, similar layout and exposed sides	7.0
219	123 & 317	Same orientation, similar layout and exposed sides	8.1
303	101-104, 201-204, 301,302 & 304	Same orientation, similar layout and exposed sides	6.4
305	306 - 310	Same orientation, similar layout and exposed sides	7.8
311	113 & 213	Same orientation, similar layout and exposed sides	7.7

401		Thermally unique	6.4
402		Thermally unique	6.7
403	404 & 405	Similar orientation, layout and exposed sides	7.9
407	406 & 408	Similar orientation, layout and exposed sides	7.4
409		Thermally unique	6.1
410		Thermally unique	7.5
Weighted Average	-	-	**7.5**

Table 2: Minimum scores to be achieved by the sample units

Sample Dwelling	Star Rating	Energy Use (MJ/m^2)	Heating Energy (MJ/m^2)	Cooling Energy (MJ/m^2)	Net Conditioned Floor Area (m^2)
B01	6.4	110.3	103.6	6.7	39.8
B05	6.7	99.8	85.9	13.9	38.3
B11	6.3	115.3	98.2	17.1	60.6
G01	8.6	40.6	32.7	7.9	51.3
G04	8.3	50.1	36.4	13.7	38.5
106	8.5	41.9	33.1	8.8	56.4
118	6.6	103.9	84.1	19.8	41.8
121	7.3	82.7	71.1	11.6	55.5
205	7.5	74.9	60.7	14.2	52.4
218	7.0	89.8	72.2	17.6	53.8
219	8.1	55.2	35.7	19.5	57.4
303	6.4	111.4	91.8	19.6	38.7
305	7.8	64.5	44.0	20.5	44.9
311	7.7	68.5	47.9	20.6	41.2
401	6.4	111.6	97.4	14.2	61.3
402	6.7	101.5	81.8	19.7	37.1
403	7.9	60.8	43.4	17.4	55.6
407	7.4	79.0	58.1	20.9	38.8
409	6.1	121.6	100.9	20.7	58.6
410	7.5	73.5	53.6	19.9	49.5
Weighted Average	**7.5**	**74.5**	**59.2**	**15.3**	

The sample ratings have been completed with the following inputs:

Building Fabric Element	Description
External Walls	External walls were modelled as concrete or lightweight (e.g. metal cladding or FC sheet). Lightweight external walls will require a minimum **R2.5** insulation provided. Concrete walls require R1.9 insulation: Some options include: • CSR Bradford Wall Batts • Knauf Earthwool Acoustic Wall Batts Insulation material with minimum 20% recycled material content will be selected. The options recommended above go beyond this requirement. External walls of Level 4 modelled as a light colour. All other levels modelled as medium colour.
Party Walls	Party walls between units modelled as double 64mm stud with 50mm R1.2 insulation to both studs Party walls to lift and stairwells and basement carpark modelled as 150mm concrete + 64mm stud with 50mm R1.2 insulation Corridor walls modelled as single stud with 75mm R1.8 insulation added.
Internal Walls	Internal walls do not require additional insulation.
Floor	Floors are assumed as 200mm suspended concrete slab. Additional **R2.35** insulation is to be added when the floor is located above the car park, services or an open communal space. Apt 401 also requires insulation to floor above balcony of 301.
Floor Coverings	Floor coverings are assumed as carpet for bedrooms, tiles for bathrooms / ensuite and floating timber for the living room and kitchen.
Ceilings	Ceilings of lower levels have been modelled as 200mm suspended slabs and will need an additional **R2.5** added insulation when located under a balcony/terrace. Some options include: • CSR Bradford Gold Ceiling Batts (R2.5) • Knauff Earthwool Ceiling Batts (R2.5) **Ceiling heights modelled as 2700mm except bathrooms at 2400mm.**
Roof Insulation	Top roof and units with whole ceiling area is roof 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	The windows and glazed doors were modelled with the following thermal performance values for glass and frame combined: Fixed Windows: U-Value = 3.6 and SHGC = 0.64 Awning Windows: U-Value = 4.6 and SHGC = 0.45

Building Fabric Element	Description
	Sliding Doors: U-Value = 3.8 and SHGC = 0.59 These values are based on clear double-glazed windows. Windows modelled as 2700mm high unless shown on elevation as smaller. Window Frames modelled as dark colour such as Monument
Window Reductions Required	**Please see marked up plans attached for 218, 219, 311, 402, 403, 409, 410. Same reductions will likely be required to any thermally similar unit.**
External Shading	**External blinds and horizontal eaves are required to achieve the cooling load limit of 21 to 311, 402, 403 and 410. Please see attached marked up plans. Same shading will likely be required to any thermally similar unit.**
Building Sealing	All doors, windows, exhaust fans and openings will be sealed so 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 7.0 Stars will be maintained as a minimum.

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 3 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 3: List of areas and their stormwater treatment measures.

Surfaces	Mark	Topographic Area (m^2)	Required Treatment
Roof and Terrace Catchment Area		1,523.4	Runoff to be diverted from level 2 roof and above roof/terrace spaces to a rainwater tank(s) with an effective storage capacity of 52,000L. The stored water is to be used for toilet flushing in communal ground floor spaces as well as units located on the basement up to and including level 3 of the development (102 bedrooms). As rainwater will be collected from trafficable terrace areas, appropriate filtration is required to remove suspended solids and gross pollutants and any odours or microbes. Irrigation systems will also be connected to the tank, to water the 412.5m^2 garden area.
Permeable Areas		203.4	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	892.2	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.

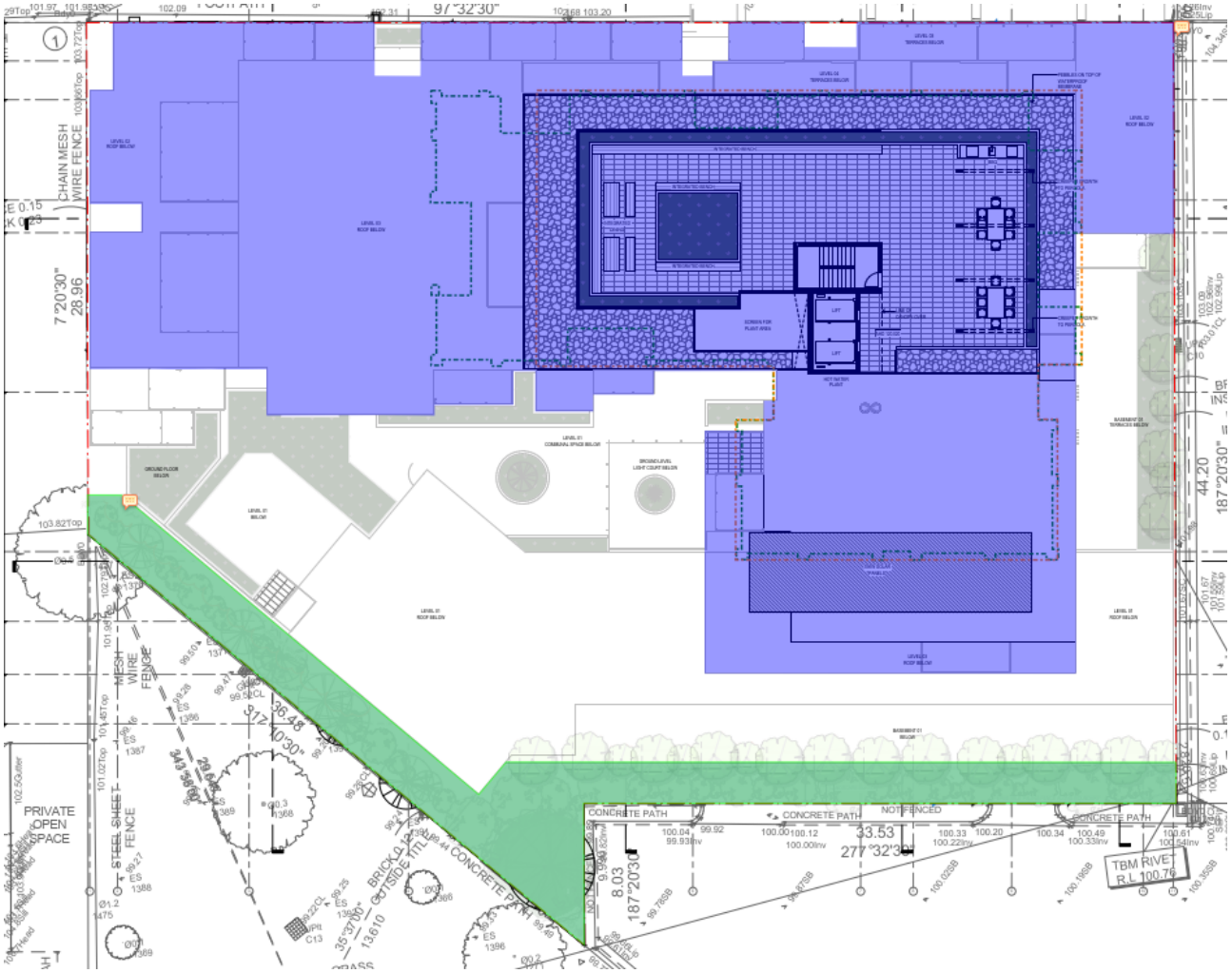


Figure 8: Site Delineation

Rainwater Reuse

For the purpose of water consumption calculations within the STORM tool, occupancy has been estimated based on the total number of bedrooms for all units on level 3 and below (102 occupants), each responsible for 16.5L/day[4] water use resulting in a total daily demand of 1,683L. Irrigation of the garden accounts for the remaining water demand.

Rainfall Calculator - Based weather data (1991-2020) for Scoresby					
Building Type	Residential	Irrigation Area	412.5	Residents	102
Roof Area	1523.4	Irrigation Demand	144375 L/year	Laundry Use	7.0 L/day
Collection Efficiency	0.5	Toilet Use	16.5 L/day	Total Laundry Use	714.0 L/day
Loss per month	2.00 mm	Total Toilet Use	1683.0 L/day	Hot water demand	6120.0 L/day
Irrigation Requirement	350.00 mm				

Month	Average Rainfall	Runoff	Irrigation Demand	Toilet Demand	Total Demand	Overall Balance
January	54.70 mm	41,665 L	38,259 L	52,173 L	90,432 L	-48,767 L
February	56.30 mm	42,884 L	37,538 L	47,124 L	84,662 L	-41,778 L
March	46.50 mm	35,419 L	26,709 L	52,173 L	78,882 L	-43,463 L
April	62.40 mm	47,530 L	578 L	50,490 L	51,068 L	-3,537 L
May	68.70 mm	52,329 L	0 L	52,173 L	52,173 L	156 L
June	71.00 mm	54,081 L	0 L	50,490 L	50,490 L	3,591 L
July	64.30 mm	48,977 L	0 L	52,173 L	52,173 L	-3,196 L
August	70.10 mm	53,395 L	0 L	52,173 L	52,173 L	1,222 L
September	77.20 mm	58,803 L	0 L	50,490 L	50,490 L	8,313 L
October	70.50 mm	53,700 L	0 L	52,173 L	52,173 L	1,527 L
November	82.20 mm	62,612 L	11,694 L	50,490 L	62,184 L	427 L
December	80.20 mm	61,088 L	29,597 L	52,173 L	81,770 L	-20,682 L
Total	**804.10 mm**	**612,483 L**	**144,375 L**	**614,295 L**	**758,670 L**	**-146,187 L**
Average	**67.01 mm**	**51,040 L**	**12,031 L**	**51,191 L**	**63,223 L**	**-12,182 L**

Figure 9: Rainfall calculation

[4] This is compliant with the AS6400 standard of one full and four half flushes/person/day; toilets are assumed to use 4.5L per full flush and 3L per half flush.

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 100%. 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.

Melbourne Water **STORM Rating Report**

TransactionID:	1259006
Municipality:	MONASH
Rainfall Station:	MONASH
Address:	554-556 High Street Road
	Mount Waverley
	VIC 3149
Assessor:	SDC
Development Type:	Residential - Multiunit
Allotment Site (m2):	2,619.00
STORM Rating %:	100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof & terrace area for RWT collection	1,500.00	Rainwater Tank	50,500.00	100	158.00	81.00
Roof & terrace area for RWT collection	23.40	Rainwater Tank	1,500.00	2	170.00	82.00
Remaining impervious area	892.20	None	0.00	0	0.00	0.00

Figure 10: STORM modelling results

Management and Maintenance Guidelines

Inspections and maintenance of the proposed stormwater treatment systems should occur regularly to ensure their ongoing performance. It is the responsibility of Building Management to ensure the appropriate measures are undertaken for the rainwater tank maintenance. Some general maintenance requirements are provided in the table below. However, any specific maintenance requirements nominated by the product's manufacturer may also apply and would supersede those outlined below. The proposed system will be nominated at the detailed design stage.

Rainwater Tank

Task	When?	Requirement
Inspect rainwater tanks	Every 6 months	- Check for any damage/compression - Check any blockage of first flush diverter - Correct operation of potable mains back up switch - Check that mesh covers have not deteriorated and intact. - Check that supporting base is free of cracks and movement. - Mosquito infestation
	Every 3-5 years	- Sludge Build up – if sludge build up occurs a vacuum tank needs to be called out to site
Inspect pumps	Every 2 years	- Serviced to prolong the pump life
Inspect roofs & gutters	Every 6 months	- Clean out of leaves / debris - Remove any overhanging branches onsite

Rainwater Filter

As a minimum, two inspections should be scheduled every year. The first scheduled maintenance event each year should involve general routine maintenance (including but not limited to the items outlined in the table below) in addition to an assessment of the products condition. This information will then inform the extent and urgency of the second scheduled maintenance for the year (i.e. whether the filter is expected to need replacing). In addition to the two scheduled maintenance events, inspection of the equipment should occur following major storm events.

Task	When?	Requirement
Inspection/Minor Maintenance	Every 6 months; and after major storm events	- Assess filter externally for observable defects/problems - Check filter is functioning correctly - Clear filter of debris and provide detail clean when required - Take notes and document external and internal filter conditions - Make arrangements for filter replacement at next scheduled maintenance event if required
Major Maintenance	Yearly or When necessary	Examples of major maintenance could include: - Replacement of filter due to end-of-life or unexpected damage - Removal of sediment build-up

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[5]. 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

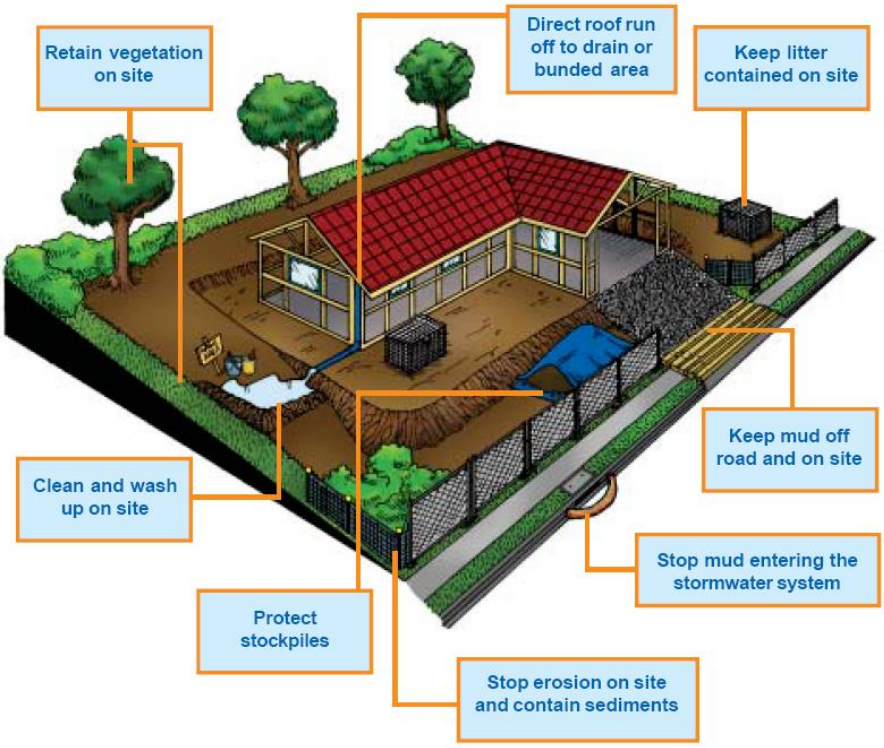
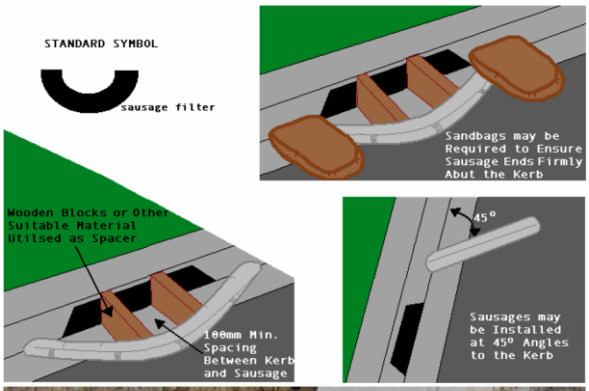


Figure 11: Stormwater will be effectively managed during construction phase according to the requirements listed in "Keeping Our Stormwater Clean – A Builder's Guide".

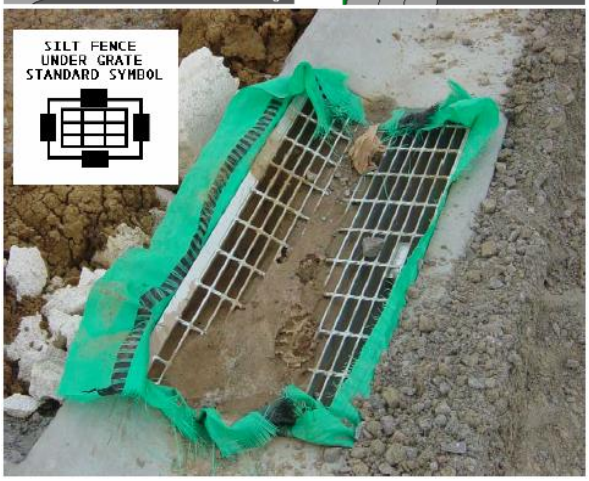
To reduce the impacts and minimise the generation of these pollutants the following measures are proposed. The symbols embedded within each image are typically used for Construction Environmental Management Plans.

[5] 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 & terrace runoff, the overall flows 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 4 - Green Star VOC and Formaldehyde Limits

Table 4: Maximum Volatile Organic Compound Levels for construction materials (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 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/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 Design and As Built v1.3 2019 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/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