SUSTAINABLE DEVELOPMENT
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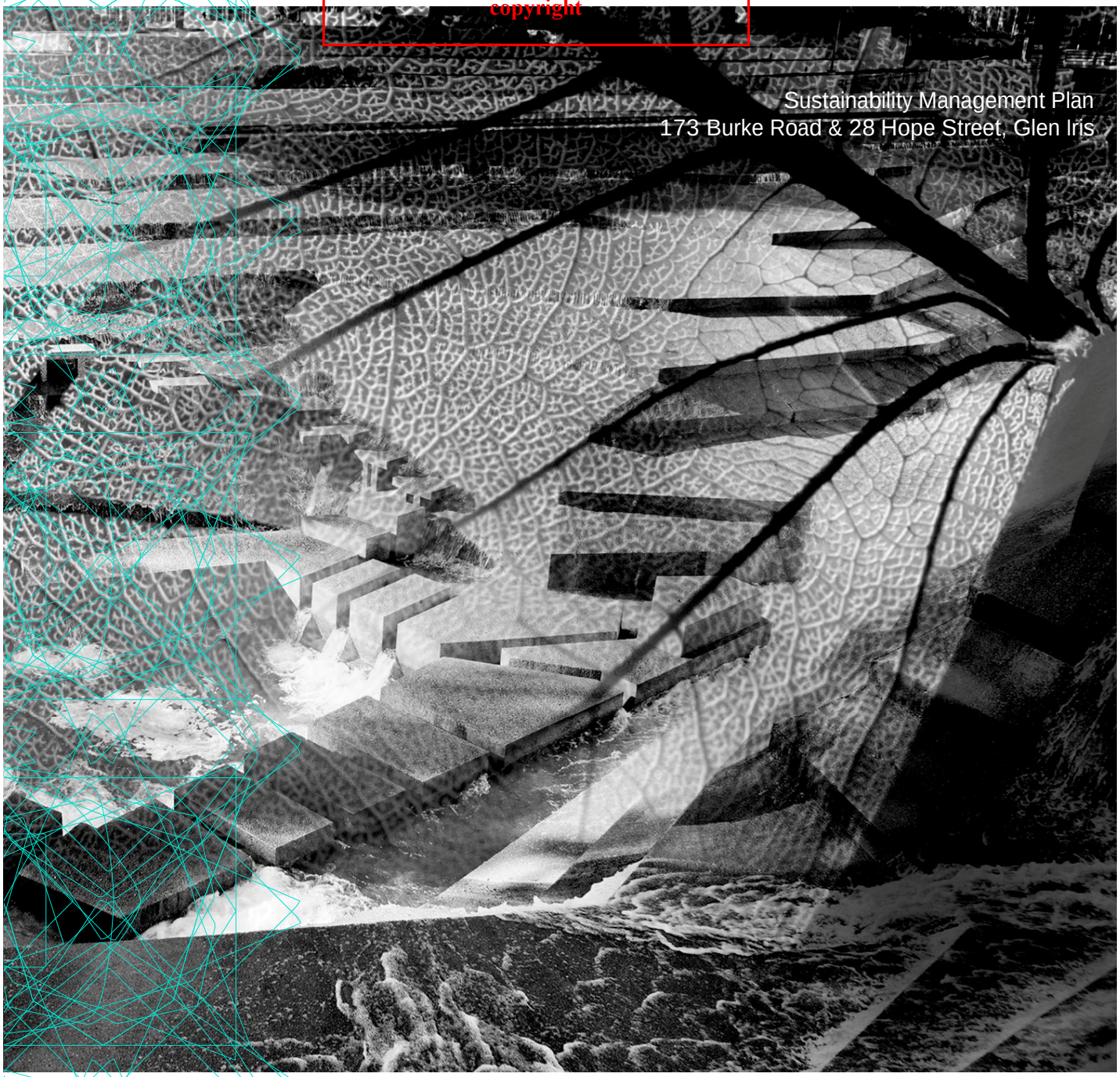

Sustainability Management Plan

173 Burke Road & 28 Hope Street, Glen Iris

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

Proposed Mixed-Use Development 173 Burke Road & 28 Hope Street, Glen Iris

Sustainability Management Plan

May 2024

S4943 SMP.V2a

PREPARED BY:

Sustainable Development Consultants

2nd Floor, 555 Riversdale Rd.
Camberwell VIC 3124

T: (03) 9882 9967 F: (03) 9882 9969
info@sdconsultants.com.au

sdconsultants.com.au

Table of Contents

Version	Date of Issue	Description	Author	Approved
V1	20-12-2023	For Council Submission	SW/HW	BdW
V2	22-04-2024	Updated FirstRate5 and Daylight Assessment	SW/HW	BdW
V2a	29-05-2024	Minor Update	HW	BdW

1. Introduction

This Sustainability Management Plan (SMP) has been prepared to assist the design, construction and operation of the proposed mixed-use development at 173 Burke Road, Glen Iris and 28 Hope Street, Glen Iris. The proposed 173 Burke Road building is to be constructed as a five-storey development comprising of retail ground floor tenancies and residential apartments above. It includes a major retail supermarket, a food and beverage tenancy and apartments with communal terraces/gardens, as well as associated basement car parking and circulation zones. The 28 Hope Street component of the project will be constructed as a three-storey residential apartment building with two apartments on each floor.

Sustainable Development Consultants have assessed the proposed development and provided input to the design team. This SMP captures initiatives necessary to ensure that the development meets the sustainability requirements of the City of Stonnington, as outlined in Section 1.3 of this report. Many of the sustainability initiatives will far exceed the minimum council requirements as the development is also targeting a 5 Star Green Star Buildings V1 rating, showcasing Australian Excellence in the built environment sustainability practices.

This document has been prepared by Sustainable Development Consultants with reference to the architectural drawings prepared by Cera Stribley Architects.

1.1 Site Description

The proposed development site is located just north of the Burke Road/Wattletree Road commercial strip within the heart of the Glen Iris residential area. It is approximately 12km south-east of the Melbourne CBD, around 1km from the Glen Iris railway station and within walking distance of multiple schools, Sacre Couer chapel and Central Park. The Burke Road development site is currently occupied by a two-storey commercial building whereas the 28 Hope Street site is currently occupied by a single-storey residential building. Both existing buildings will be demolished prior to enable the construction of the proposed development.

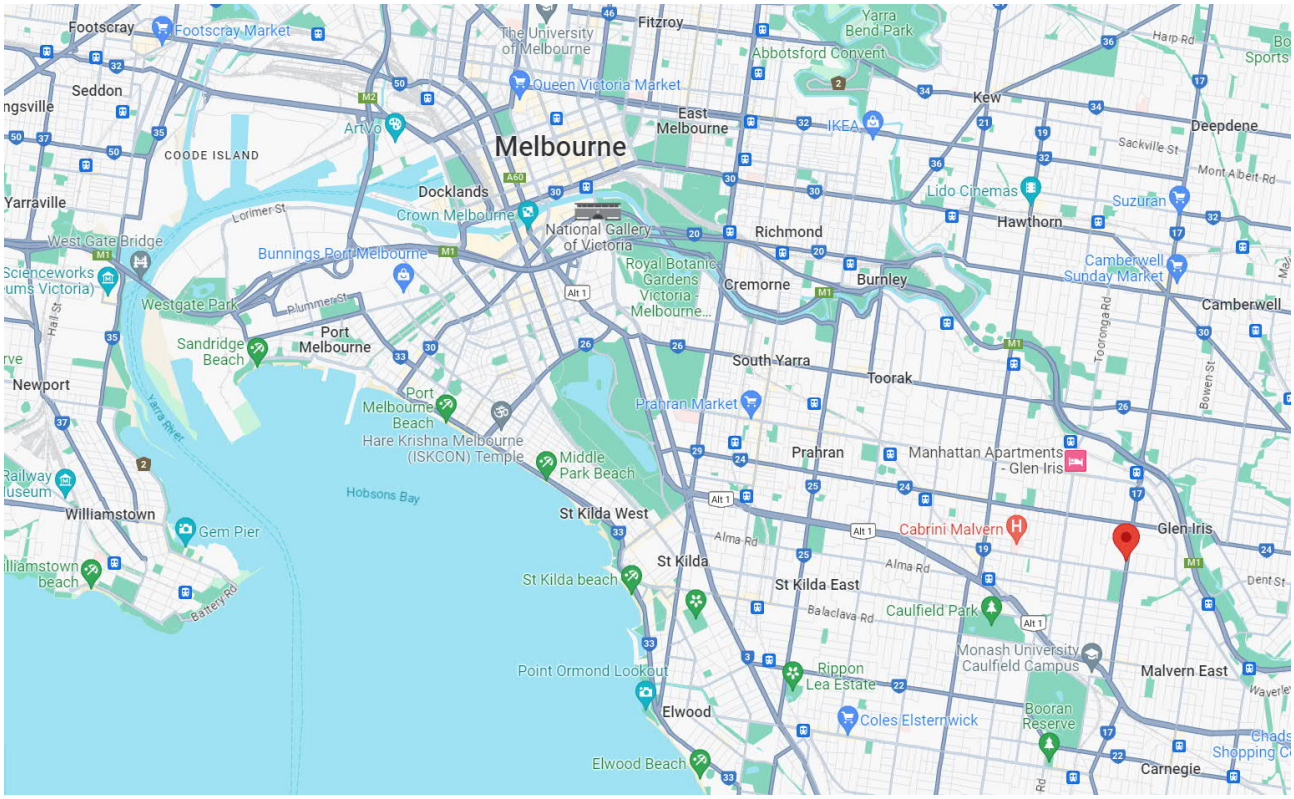

Figure 1: Location of 173 Burke Road and 28 Hope Street, Glen Iris in relation to the Melbourne CBD (Source: Google Maps)

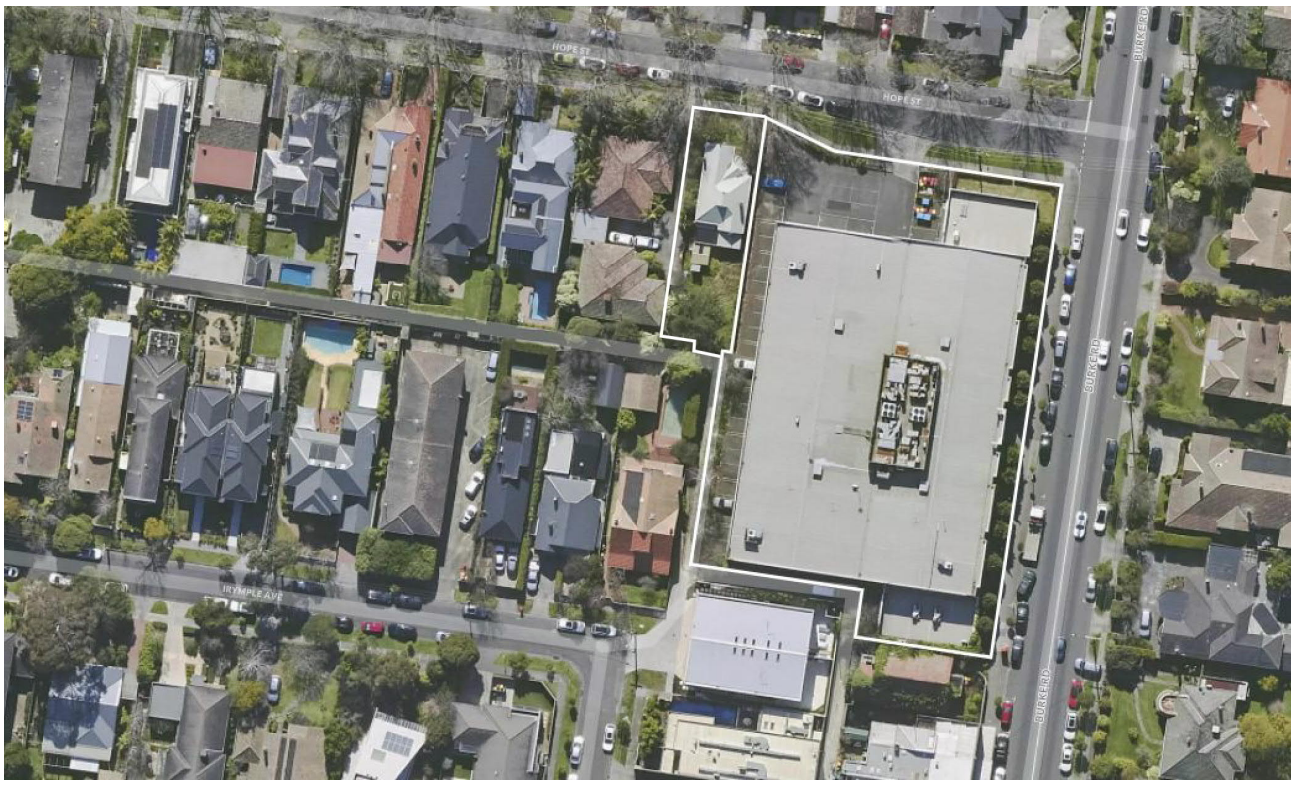

Figure 2: Aerial image of the development site at 173 Burke Road, Glen Iris and 28 Hope Street, Glen Iris (Source: LandChecker, mark-up by SDC)

1.2 Development Summary

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

Table 1: Development Summary

Development Information	
Total Site Area	173 Burke Road 4,306m^2 28 Hope Street 446m^2
Carparking	173 Burke Road 170 x retail car spaces at basement level (include 2 disabled, 4 motorcycle, 6 pick-up and 4 people with pram parking spaces) 120 x residential car spaces at basement level (including 2 disabled parking spaces) 2 x parallel street parking spaces on ground level 28 Hope Street 3 x carpark spaces on ground level
Bikes	173 Burke Road 49 x residential bike parking spaces, 14 x retail staff bike parking space and 16 x retail visitor bike parking spaces at basement level 16 x retail visitor and 6 residential visitor bike parking spaces on ground level

Development Information	
	28 Hope Street 6 x residential bike parking spaces and 6 x visitor bike parking spaces on ground level
Commercial	173 Burke Road Woolworths Supermarket (2,633m^2) and Food & Beverage (125m^2)
Residential	173 Burke Road 58 apartments (30 x two-bedroom, 26 x three-bedroom, 2 x one-bedroom apartments) 28 Hope Street 6 apartments (4 x two-bedroom and 2 x one-bedroom)

1.3 Stonnington City Council Requirements

Stonnington City Council is committed to encouraging environmentally sustainable development. Critical to achieving this commitment is ensuring that development responds to site opportunities and constraints and adopts best practice that demonstrably minimises environmental impacts.

The City of Stonnington expects that the proposed mixed-use development should achieve best practice in environmentally sustainable development from the design stage through to construction and operation. To comply with the Local Planning Scheme including Clause 15.02-1L-02 *Environmentally Sustainable Development* this project is required to satisfy the objectives as set out within the following categories, where applicable:

- Energy Performance
- Integrated Water Management
- Indoor Environment Quality
- Transport
- Waste Management
- Urban Ecology

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

The City of Stonnington also requires that the proposed development addresses the following planning scheme provisions:

- Clause 52.34 *Bicycle Facilities*
- Clause 53.18 *Stormwater Management in Urban Development*
- Clause 58 *Apartment Developments*
- Clause 58.03 *Site Layout*
- Clause 58.07 *Internal Amenity*

In February 2020, the City of Stonnington declared a climate emergency and as part of this, are committed to enhanced Environmentally Sustainable Design.

1.4 ESD Assessment Tools

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

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

1.4.1 GREEN STAR BUILDINGS V1.B

The Green Star Buildings tool was created by the Green Building Council of Australia (GBCA) for new buildings and major refurbishments. The tool helps to assess and benchmark projects against a thorough set of criteria, specifically designed to ensure that all buildings meet the new definition of a sustainable building and reward both best practice and innovative sustainable design approaches. Green Star Buildings aims to meet both current and future demands of the built environment, and to address the key issues of the next decade being climate action, resource efficiency and health and wellbeing.

Green Star Buildings strives to push all buildings to be net zero carbon in operations. The goal is that all buildings from 2030 onwards in Australia are delivered net zero in operations to support the Paris Agreement (the international treaty on climate change). The tool was designed to address sustainability megatrends of the next decade, and to support the strategic goals of governments, developers, building owners, tenants and investors. All new buildings must meet the same set of minimum expectations to set a benchmarked understanding of what a Green Star certified building looks like. Further, Green Star Buildings aims to drive supply chain transformation by creating demand for low carbon, innovative and responsible products.

The tool assesses projects against a set of eight (8) categories, which represent key issues that will define the built environment over the next decade. These are:

- Responsible
- Healthy
- Resilient
- Positive
- Places
- People
- Nature
- Leadership

The levels of achievement in this tool are defined as: 4 Star Green Star being "Best Practice", 5 Star being "Australian Excellence", and 6 Star being "World Leadership". The project is seeking to achieve a Green Star Buildings v1 rating, with a 5 Star rating minimum being targeted, which requires a minimum of 35 points in addition to the 15 minimum expectations which are applicable at all levels of certification.

The 15 minimum expectations must be achieved to receive a certified rating, ensuring that all buildings are energy efficient, water efficient, good healthy spaces, built responsibly, and are not built on highly sensitive sites. Further, there is a Net Zero Carbon in Operations minimum expectation for all buildings aspiring to a 6 Star Green Star Rating. This path also becomes mandatory for 5 Star buildings registering from 1 January 2023, and then for all buildings registering from 1 January 2026. From 1 January 2030, all buildings achieving certification must comply with the Net Zero Carbon in Operations path.

The results of the Green Star Buildings assessment can be found in Appendix 1 of this report.

1.4.2 MELBOURNE WATER STORM CALCULATOR

Melbourne Water has developed the STORM calculator to simplify the analysis of stormwater treatment methods. The calculator is designed to enable a simple assessment of Water Sensitive Urban Design (WSUD) measures. The STORM Calculator determines the amount of treatment that typical WSUD measures will provide in relation to best practice targets.

The results of the STORM assessment can be found in Appendix 3 of this report.

1.4.3 DESIGNBUILDER

DesignBuilder is a comprehensive analytical software package that analyse the energy and economic impacts of building-related selections such as architectural features; heating, ventilation and air-conditioning (HVAC) systems; building utilisation or scheduling, and financial options. DesignBuilder includes weather data including, latitude, longitude, altitude, time zone, and summer and winter design conditions; hourly observations information such as dry-bulb and wet-bulb temperatures (OADB, OAWB), humidity ration (HR), cloud cover (CCM), wind velocity, and outdoor air pressure (OAP). DesignBuilder was used for both the thermal performance modelling (verification method J1V2) and daylight modelling of the proposed building.

Results of the thermal performance modelling are presented in Appendix 6.

Results of the daylight modelling are presented in Appendix 7.

2. Sustainability Initiatives

The following sections outline the initiatives that will be incorporated into the development throughout its design, construction and operation. The initiatives are listed through the Green Star Buildings Credits and referenced where they align with Stonnington City Council requirements (e.g. 2 - Responsible Construction**,** *Waste Management*). Each credit aligns with the Green Star Scorecard which is provided in Appendix 1. Some initiatives without the Green Star reference have also been included as they also contribute to the overall sustainability of the development.

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

The following are the broad project stages:

1	Design Development	• Consultants develop conceptual design drawing to a detailed stage suitable as a basis for preparing working drawings - Integration of architectural, services, structure and site attributes • Checking compliance with all statutory requirements, codes and standards • Arranging special surveys or reports as required
2	Construction Documentation	• Architectural and services drawing sets completed • All specialist reports completed • All necessary planning and building consents obtained as required by authorities
3	Construction	• All work carried out onsite – site preparation, construction, alteration, extension, demolition • Purchase of all materials / certification • Evidence gathering from subcontractors • Commissioning
4	Post Occupancy	• Operation and Maintenance • Education – Building Users Guides

2.1 Responsible

The 'Responsible' category encourages buildings to be designed, procured, built and handed over in a responsible manner.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
1 - Industry Development	*Credit Achievement (1 point)* A Green Star Accredited Professional (GSAP) must be engaged and involved in all stages of the project leading to certification. SDC could perform the GSAP role. The building owner/developer is required to disclose the cost of sustainable building practices to the Green Building Council of Australia (GBCA) and market the buildings sustainable achievements.	One of the project's consultants will be a Green Star Accredited Professional. They will advise through the design and construction phases of the project.	ESD Consultant	Design Development
2 - Responsible Construction *Waste Management*	*Minimum Expectation* The builder/head contractor must have an Environmental Management System (EMS), for contracts valued at over $10 million it must be certified to a recognised standard such as ISO 14001. A project specific Environmental Management Plan (EMP) is to be developed to cover the scope of construction activities. The head contractor must provide training on the sustainability targets of the building to 95% of all contractors and subcontractors present on site for at least three days, during the induction process. *Credit Achievement (1 point)* At least 90% of construction and demolition waste is to be diverted from landfill.	The builder or head contractor will create and implement an environmental management system to manage its environmental impacts on site, and an environmental management plan to cover the scope of construction activities. The head contractor will also provide training on the sustainability targets of the building. At least 90% of construction and demolition waste will be diverted from landfill, and contractors and facilities comply with the Green Star Construction and Demolition Waste Reporting Criteria.	Builder / Head Contractor	Construction Documentation

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	A Disclosure Statement is required from waste contractors and processing facilities outlining how the company and their reporting aligns with the Green Star Construction and Demolition Waste Reporting Criteria.			
3 - Verification and Handover	*Minimum Expectation* The building must have accessible energy and water metering for all common uses, major uses and major sources to allow for optimum ongoing management. Prior to construction, environmental performance targets are to be set, a services and maintainability review is to be undertaken, and design for airtightness confirmed. Operations and Maintenance information must be provided for all nominated building systems to the building owner and facilities management team at the time of practical completion. *Credit Achievement (1point)* The project must either: • Engage an Independent Commissioning Agent (ICA) to advise, monitor and verify the design, planning, commissioning and tuning activities. • Use 'The Soft Landings Framework Australia and New Zealand' approach published by CISBE ANZ, involving the future facilities management team. *Note:* For buildings with a Total Building Value of over $20m, both requirements must be met	The design will include electronic metering systems that will be integrated into the building to monitor and report on all energy and water uses. Documented targets will be set for the environmental performance of the building (energy and water). These targets will be monitored and reported on. A qualified ICA will be engaged to report directly to the building owner, independent of any party that has been involved in the installation of the nominated building systems. The ICA will provide an unbiased perspective of the commissioning process, assisting the project team in undertaking the commissioning of the nominated building systems, ensuring that the building functions in an efficient and safe manner. Prior to construction, a services and maintainability review will be undertaken, and design for airtightness confirmed. During construction and practical completion, the head contractor will commission the building, engage a building tuning service provider and test for airtightness. The air tightness test will be conducted according to AS/NZS ISO 9972:2015, across all conditioned spaces.	Services Consultants	Construction Design Documentation

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	for credit achievement.			
4 - Responsible Resource Management *Waste Management*	*Minimum Expectation* Separation of waste must be provided for general waste, commingled recycling and organics (along with any additional waste streams identified within the Waste Management Plan, such as batteries and/or e-waste). A dedicated waste room for the storage and collection of the appliable waste streams must be provided, along with a bin washing area. These storage areas must be designed for safe and efficient access by both occupants and collection contractors. A waste specialist must sign-off on the designs to confirm they are adequately sized and located for convenient storage and collection of the waste streams identified, per the Waste Management Plan.	The development will be provided with dedicated waste storage area(s) for the separation and storage of general and recycling waste. This waste storage area(s) will be located where it will be easily accessed by building staff and waste contractors, to promote waste avoidance and encourage recycling. In addition to general waste and recycling, the development will also provide facilities to collect hard waste, cardboard and collect material for composting. An E-waste bin will also be provided to residential bin room allowing residents to dispose their E-waste safely. The waste area will be large enough to allow for future changes in waste management needs. *Woolworths Response:* The Woolworths Supermarket will have its own waste management facility. It will be provided with dedicated waste storage area(s) for the separation and storage of general and recycling waste. Additionally, battery and mobile phone recycling unit will be provided to safely recycle E-waste. Edible unsold food: The supermarket will be donating 100% of edible unsold food, to ultimately ensure there is no edible food going to landfill. Cardboard: Any unused cardboard will be	Waste specialist / Services Consultants / Architect	Construction Design

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
		collected by staff and stored near the check-out, allowing customers to collect it for reuse. Organics: Separated and collected for reuse or composting. Fat and bone: Separated and collected by external company for reuse. Chicken fat and oil: Stored for external collection and reuse. Grease trap waste: Emptied and maintained by external company.		

Figure 3: Examples of waste management initiatives found in other Woolworths's supermarkets (https://www.woolworths.com.au/shop/discover/sustainabilitySource: Woolworths)

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
5 - Responsible	*Credit Achievement (1 point)*	A risk and opportunities assessment of 10 key	ESD Consultant	Construction

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
Procurement	Prior to the appointment of the Head Contractor, a risk and opportunities assessment of 10 key items in the project's supply chain must be undertaken to identify environmental, social and human health risks following ISO 20400 Sustainable Procurement – Guidance. A responsible procurement plan must then be developed to mitigate risks and implement opportunities identified in the assessment.	items in the project's supply chain will be undertaken to identify environmental, social and human health risks. A responsible procurement plan will then be developed to mitigate risks and implement opportunities identified.	/ Builder / Architect	Documentation
6 - Responsible Structure	*Credit Achievement (3 points)* 50% of all structural components (by cost) must meet a Responsible Products Value (RPV) of at least 10. The structure is defined as load bearing and stability components of a building, including steel, timber, and concrete elements. The values for each product can be calculated using the Responsible Products Value calculator (RPVC)[1].	50% of all structural components (by cost) will meet a Responsible Products Value (RPV) of at least 10. This will consider aspects such as human rights, labour practices, the environment, fair operating practices, consumer issues and community involvement and development.	Builder/Architect	Construction Documentation
7 - Responsible Envelope	*Credit Achievement (2 points)* 30% of all building envelope components (by cost) must meet an RPV of at least 10. The envelope is defined as the elements that surround the building such as the façade and its external shading, insulation, suspended slabs and roofing system components. The values for each product can be calculated	30% of all building envelope components (by cost) will meet an RPV of at least 10 (as per considerations outlined in Credit 6).	Builder / Architect	Construction Documentation

[1] The Responsible Products Value (RPV) of a product is calculated by manufacturers and suppliers based on the relevant initiatives (compliant third-party schemes and verification methods) their product complies with. This value is then multiplied by the key component makeup to determine the RPV score, however, the RPV calculator is not yet available and therefore it is unknown if the required credit value is achievable.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	using the RPVC.			
9 - Responsible Finishes	*Credit Achievement (1 point)* 40% of all internal building finishes (by cost) must meet a RPV of at least 7. Internal finishes include flooring, plasterboard, paints, ceilings, partitions, doors, internal glazing partitions, sealants, adhesives and joinery used as wall finishes. The values for each product can be calculated using the RPVC. and will be achieved based on the project committing to selecting products with environmental certifications. These can be products with Environmental Product Declarations, Global Green Tag certification, ISO14001 certification, Climate Active Carbon Neutral Certification, Chain of Custody certification, third-party product certifications schemes and reused products.	40% of all internal building finishes (by cost) will meet a RPV of at least 7 (as per consideration outlined in Credit 6). Example products with Environmental Product Declarations include Wattyl paints and Armstrong Ceilings. Laminex and Polytec have GreenRate GreenTag Certifications.	Builder / Architect	Construction Documentation

Figure 4: Examples of approved environmental labels for products which may be incorporated for the development.

2.2 Healthy

The 'Healthy' category emphasises the important role the built environment has in enhancing the health and wellbeing of occupants.

In retail buildings, staff are the most valuable resource, and small improvements in morale and productivity will more than pay for any extra costs in delivering better infrastructure. In the residential sector, occupants and buyers now consider health as a key priority when making decisions.

<table>
<tr><th>Credit Name</th><th>Credit Requirement</th><th>Project Response</th><th>Responsibility & Implementation</th><th>Project Stage</th></tr>
<tr>
<td>10 – Clean Air
Indoor Environment Quality</td>
<td>
Minimum Expectation

Non-residential component of the proposed building must maintain acceptable levels of indoor pollutants by ensuring ventilation systems are designed to comply with AS 1668.2:2012 regarding minimum separation distances between pollutant sources and outdoor air intakes. All ductwork that serves the building must also be cleaned prior to occupation.

Pollutants entering the building must be minimised by either removing the source of pollutants or exhausting them directly to the outside.

Class 2 (Residential) ventilation systems must be designed to comply with the separation distances as outlined in the table below. The table below is based on the Australian Standards 1668.2:2012 (table 3.4) and applied in the same way.
<table>
<tr><td>Airflow rate within the minimum distance (L/s)</td><td>Minimum separation distance from discharges to intakes, or
natural</td><td>Minimum separation distances from discharges to intakes, or natural</td></tr>
</table>
</td>
<td>
For the mechanically ventilated spaces, outdoor air is to be provided at a rate of 100% greater than the minimum required by AS 1668.2:2012 for the non-residential building and 50% greater for the Class 2, Or carbon dioxide (CO_2) concentration is to be monitored and maintained below 700ppm.

Any mechanical ventilation systems must provide access to both sides of all moisture and debris-catching components for maintenance within the air distribution system.

Any kitchen areas within the development will have an exhaust that will take air directly out of the building without any recirculation.

This will ensure a healthy indoor environment quality for the wellbeing of staff and customers.

For residential component, where ventilation is by natural means, an engineered natural ventilation system with a minimum equivalent ventilator area per bedroom and living space of at least 15,000mm^2, with a minimum total ventilator area of 40,000mm^2 per dwelling. Ventilators must be independent of any mechanical extract fans. Ventilators must be located at either:

– Minimum of 1,750mm above finished floor level where the dwelling has multiple
</td>
<td>Architect / Services Consultant</td>
<td>Design Development</td>
</tr>
</table>

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	<table><tr><td></td><td>ventilation opening of adjacent Sole Occupancy Unit, or site boundary (m)</td><td>ventilation opening within Sole Occupancy Unit (m)</td></tr><tr><td><100L/s</td><td>1</td><td>N/A</td></tr><tr><td><200L/s</td><td>2</td><td>1</td></tr><tr><td><400L/s</td><td>3</td><td>2</td></tr><tr><td><600L/s</td><td>4</td><td>3</td></tr><tr><td><800L/s</td><td>5</td><td>4</td></tr><tr><td><1,000L/s</td><td>6</td><td>5</td></tr><tr><td>≤1,000L/s</td><td>7</td><td>6</td></tr></table> Diversity factors cannot be applied in meeting this credit. *Credit Achievement* The project must: • Provide adequate access to the building's mechanical ventilation systems for easy maintenance. • Provide a high level of outdoor air.	exposed facades or less than 70% of equivalent area is located on the one façade. – At both high (min 1,750mm above finished floor level) and low (maximum 750mm below finished floor level) location where the dwelling has single exposed façade or more than 70% of equivalent area is located on the one façade.		
11 - Light Quality *Indoor Environment Quality*	*Minimum Expectation* Lighting within the building must meet minimum comfort requirements, specified by the best practice illuminance levels recommended in AS/NZS 1680.1:2006, a minimum Colour	All luminaires will be installed with the best practice illuminance levels, the appropriate minimum CRI, flicker free and fitted with baffles, louvres or diffusers to limit glare across the regularly occupied areas.	Builder / Services Consultant	Design Development

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	Rendering Index (CRI) of 85 or higher and a MacAdam Ellipse of 3 or lower. All LED lighting across the development must have no observable effect as per the standard IEEE 1789-2015. Glare from light sources mut be limited within regularly occupied areas by selecting LED luminaires with low glare that must not exceed the maximum values listed in Table 8.2 of AS/NZS 1680.1:2006. The building provides adequate levels of daylight through solutions that exceed typical relevant federal, state, or local regulations.	The reliance on lighting systems is reduced by maximising the available daylight through adequate glazing to the ground floor tenancies. These spaces will be fitted with operable internal blinds for windows to provide control for visual comfort and prevent excessive direct sunlight entering the spaces. All living rooms and bedrooms in each apartment will have access to a view and daylight. Best practice artificial lighting requirements will be incorporated into the project's lighting design and specifications.		
12 - Acoustic Comfort *Indoor Environment Quality*	Minimum Expectation An Acoustic Comfort Strategy must be prepared describing how the building design will deliver acoustic comfort to the building occupants.	An Acoustic Comfort Strategy will be prepared describing how the building design will deliver acoustic comfort to the building occupants. This will address: • Internal noise levels • Acoustic separation • Impact noise transfer through floors • Reverberation control	Acoustic Consultant	Design Development
13 - Exposure to Toxins *Indoor Environment Quality*	*Minimum Expectation* At least 95% of internally applied paints, adhesives, sealants (by volume) and carpets (by area) must meet stipulated Total Volatile Organic Compounds (TVOC) Limits. At least 95% (by area) of all engineered wood products must meet the specified formaldehyde emissions limits.	Indoor air pollutants will be reduced by encouraging the use of materials with low toxic chemicals. All paints, adhesives and sealants, flooring, and wall and ceiling coverings will not exceed limits outlined in Appendix 4. The development will adhere to ensuring that paints with an Ultra-Low VOC are used, not exceeding the maximum TVOC content of 5g/L for over 50%	Builder / Services Consultant	Design Development

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	Credit Achievement (2 points) A test must be undertaken after practical completion of the project to verify that the TVOC and formaldehyde levels are within the concentration limits. The number of samples to be collected is dependent on occupied area or floors (whichever is larger) and three samples, representative of where the occupants are likely to spend most of their time, are to be taken per floor.	of paints (by volume) used. All engineered wood products will have 'low' formaldehyde, certified as E0 or better. Alternatively, products with no formaldehyde will be specified. Emissions limits are listed in Appendix 4. Products such as Ecological Panel – 100% post-consumer recycled wood (or similar) will be considered for use within the development.		

2.3 Resilient

The 'Resilient' category allows building owners to demonstrate to investors and the community that risks that threaten the short- and long-term performance of the building have been considered.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
16 - Climate Change Resilience	*Minimum Expectation* The potential impacts of climate change must be considered by communicating the building's exposure to climate change risks through a pre-screening checklist. The checklist can include, but is not limited to, direct damage, failure of accelerated deterioration of project components, reduced design life and operating capacity and impacts to surrounding areas and the health and wellbeing of occupants. *Credit Achievement (1 point)* A qualified professional must undertake a climate change risk and adaptation assessment	A pre-screening checklist will be completed to identify the building's exposure to climate change risks. A Climate Adaptation Plan will then be developed for the project in which several climate change scenarios and their impact on the project will be assessed, with measures put in place to reduce these predicted effects. As a start point, the following risks have been identified for the project and actions will be required to address the associated risks. Risk 1: Potential damage from increased storm and rainfall intensity. Response 1: Downpipes to be sized capable of withstanding high volumes of water flowing	Architect / ESD Consultant	Design Development

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	that aligns with the AS 5334:2013 Climate change adaptation for settlements and infrastructure and risk management principles outlined in AS/NZ ISO 31000:2009 Risk Management The risks rated as 'Extreme' or 'High' must be addressed through design or future operational responses. Regardless of rating, at least two identified risks must be addressed by specific design responses. SDC can perform this assessment.	over the roofs, with eaves gutters designed for a 1 in 20yr five-minute storm event and surface drainage & box gutters designed for 1 in 100yr storm events. Risk 2: The impact of prolonged droughts could cause unreliability to the water supply and require more dependence on the state water supply. Response 2: A total capacity of 85kL rainwater tank will be provided for the development for reuse in toilets and for irrigation. Further, drought-tolerant plants will be selected (predominantly indigenous) for landscaped area. Risk 3: Rising temperatures will cause the urban heat island effect to increase, compounding the risk of extreme heat in this development. Response 3: Light coloured terrace paving and roof colour, along with the provision of vegetation, helps to mitigate the UHIE. Risk 4: An increase in intense rainfall, wind and hail events may result in extensive damage to property. This will invoke clean-up and maintenance costs. Response 4: High quality solar panels with tempered glass would be up to six times stronger than pane glass, and able to withstand most hail events. Furthermore, ensuring comprehensive insurance includes the solar panels and the whole site is a good safeguard.		
18 – Operations	*Credit Achievement (2 point)*	Operations resilience assessment need to be	Architect	Design

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
Resilience	The project team undertakes a comprehensive review of the acute shocks and chronic stresses likely to influence future building operations. • The building's design and future operational plan addresses any high or extreme system-level interdependency risks. • The building's design maintains a level of survivability and design purpose in a blackout.	prepared by qualified professional. As a minimum, the operations resilience assessment must address shocks in relation to failure of critical infrastructure (power, water and digital), health pandemic, water security, geological hazards (landslides, earthquakes, tsunamis) and direct attack (cyber and physical), as well as addressing stresses in relation to ageing infrastructure, rising cyber dependency, increasing energy costs and lack of transport accessibility and availability. The project team must ensure risks are managed as follows: • All risks rated as 'Extreme' must be addressed through specific design responses • All risks rated as 'High' must be addressed through design or future operational responses • Regardless of risk rating, at least two risks identified in the assessment must be addressed by specific design responses The project team must also perform an assessment of the building's survivability in the case of a blackout. The building must then be designed to account for its design purpose and provide a measure of survivability for the likely occupants.		Development

2.4 Positive

The 'Positive' category encourages buildings to strive towards two goals: reducing energy consumption and switching to renewable energy. The category also focuses on the importance of reducing water consumption and acknowledges the value in understanding the full life cycle impacts of the building.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
21 - Upfront Carbon Emissions *Energy Performance*	*Minimum Expectation* The building's upfront carbon emissions must be reduced by at least 10% compared to a reference building. These reductions must occur through good design and material selection. *Credit Achievement (2 point)* The building's upfront carbon emissions must be reduced by at least 20% compared to a reference building. These reductions must occur through good design and material selection.	The materials chosen for the design and construction of the building will ensure that the building's upfront carbon emissions will be reduced by at least 20% compared to a reference building. The expected design requirements to achieve this are high percentage of cement replacement across the project. Steel to be post-consumer recycled steel. Finishes to be chosen with reduced upfront carbon in mind by selecting products which have an Environmental Product Declaration that demonstrates the upfront carbon associated with the product. Maximising use of timber throughout the design will also help reduce upfront carbon of the building.	ESD Consultant / Mechanical Engineer / Architect	Design Development
22 - Energy Use *Energy Performance*	*Minimum Expectation* For non-residential component, the building's energy use must be reduced by at least 10% compared to a reference building measured as MJ/year. For residential component (for projects adopting NCC 2022 provision), the area weighted average NatHERS score across the development needs to meet at least 7.5 stars with each apartment rated at least 6 stars.	Non-residential energy modelling has been undertaken to ensure that the proposed building fabrics will provide an improvement in heating and cooling energy when compared with the reference building. The proposed building usage is expected to be less than 10% of the greenhouse gas emissions of the reference building, in accordance with the requirements of J1V2 of the BCA 2022. In addition to this, to meet the credit achievement requirement for Green Star	ESD Consultant/ Electrical / Mechanical Engineer	Design Development

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	Credit Achievement (3 points) For non-residential component, the building's energy use must be reduced by at least 20% compared to a reference building measured as MJ/year. For residential component (for projects adopting NCC 2022 provision), the area weighted average NatHERS score across the development needs to meet at least 7.5 stars with each apartment rated at least 6.5 stars.	Building, at least 20% energy reduction needs to be achieved. The significant solar PV system (see below) will further reduce the annual greenhouse gas emissions, allowing a minimum of 20% energy reduction to be achieved. Refer to Appendix 6 for energy modelling detail. The non-residential component at Ground Level will target a 20% reduction in energy demand against a reference building through efficient HVAC systems. These conditioned spaces are to be provided with HVAC systems with COP/EER minimum 10% better than the MEPS values. Heat Pump domestic hot water COP minimum 4.0 and target a 15% reduction in lighting power density. Dwellings are to be provided with hot water from a central Heat Pump system with COP minimum 4.0 and central VRF air conditioning system with min COP of 3.5. Hot water pipes are to be insulated to minimum R2.0 outside of dwellings, and minimum R0.5 inside dwellings. Lifts will be selected with minimum energy efficiency of Class A or B and idle/standby power in accordance with ISO 25745-2. All lift lobbies and hallways (excluding the main entrance lobby) are to be either naturally ventilated or supplied with supply/exhaust air only with no heating or cooling. The HVAC refrigerants selected for the proposed building will have a low or zero GWP, preferably Carbon Dioxide.		

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
		For residential dwellings, the area weighted average NatHERS score across the development will meet at least 7.5 stars with each apartment rated at least 6.5 stars.		
23 - Energy Source *Energy Performance*	*Minimum Expectation* The project team must develop a Zero Carbon Action Plan must be signed off by the building owner/developer and included in any operational documents for the building. The plan must include a target date by when it is expected to be fossil fuel free and cover all energy consumption, procurement, generation and infrastructure provided for future occupants. *Credit Achievement (3 points)* 100% of the building's electricity must be accounted for and sourced from renewables, either on-site or off-site. *Exceptional Performance (3 points)* 100% of the building's energy must be sourced from renewables. This credit will be claimed through a Power Purchase Agreement which the developer will retain ownership/management of. This contract must have a minimum length of 5 years or 3 years if the developer has signed to the Global Net Commitment for Net Zero Carbon Buildings managed by World GBC.	A Zero Carbon Action Plan will be signed off by the building owner/developer, detailing a target date by when the building will be fossil fuel free. The total operating Greenhouse gas emissions will be reduced through the implementation of the following ESD initiatives: • A high-performance building fabric and mindful building design which includes appropriate orientation • Highly efficient building systems • External shading devices (if required by the energy assessment) Additionally, 100% of the building's electricity and energy demand will be met through renewable energy, through solar PV systems and Green Power procurement. Space on the roof of the proposed development will be allocated for the provision of minimum 100kW solar PV system, being used to offset ground level tenancy energy use and common area of the residential component. No fossil fuels will be burned on site for electricity, heating or cooling.	ESD Consultant / Building Services Engineer	Design Development
24 - Other Carbon	*Credit Achievement (2 points)*	The proposed development must either	ESD Consultant	Design

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
Emissions *Energy Performance*	The project must comply with one of the following criteria: • Eliminating Refrigerants • Offsetting Refrigerants	eliminating refrigerants by eliminating high-GWP refrigerants or ensuring that 100% of carbon emissions from refrigerants are offset.	/ Building Services Engineer	Development

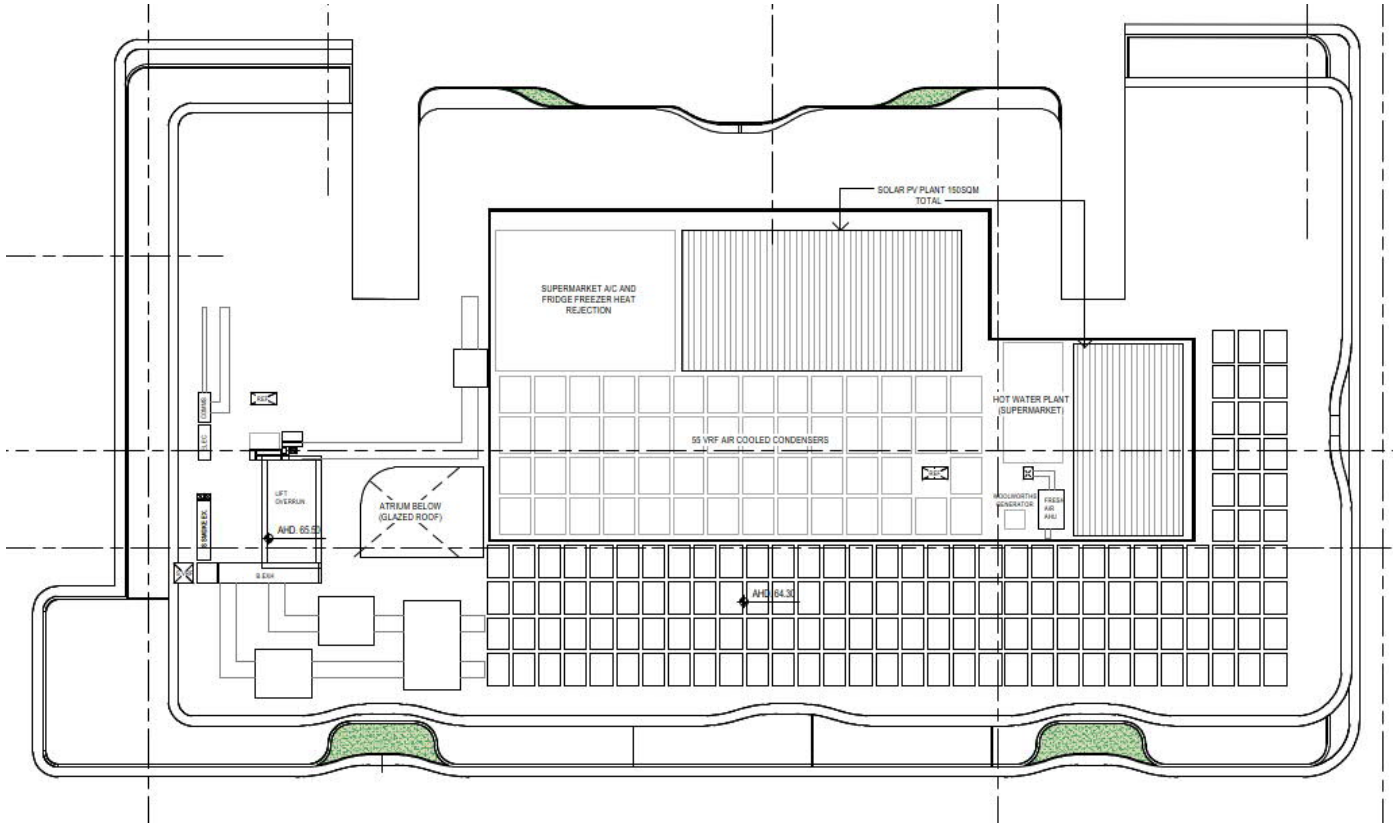

Figure 5: Indicative solar PV location mark-up.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
25 - Water Use *Integrated Water Management*	*Minimum Expectation* The building must use 15% (10% for Class 2 components) less potable water compared to a reference building or ensure all fixtures and water-using appliances installed within the project's scope, at a minimum, meet the following WELS ratings: • Taps: 5 star, • Toilets & Urinals: 4 & 5 star respectively, • Showers: 3 star, and • Dishwashers: 5 star. *Credit Achievement (3 points)* The building's potable water use must be 45% (40% for Class 2 components) less, compared to a reference building. It must also provide infrastructure for recycled water connection.	The building will use 45% (40% for Class 2 components) less potable water compared to a reference building. The building will include efficient fittings and fixtures to reduce the volume of mains water used in the development. The following Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Taps: 5 Star; • Toilets: 4 Star; • Showers: 3 Star; and • Dishwashers: 5 Star. The building also reduces its reliance on potable water through use of the captured rainwater for toilet flushing and irrigation. Refer to Appendix 2 for Potable Water Calculator results. Low-water-use indigenous species favoured for landscaping to reduce irrigation requirements. Where a fire system is installed, a minimum 80% of test water discharged from the sprinkler systems is to be returned to the fire tank (recirculated).	Architect / Services Consultant	Design Development
26 – Life Cycle Impacts *Waste Management*	*Credit Achievement (2 points)* The building must demonstrate a 30% reduction in life cycle impacts when compared to standard practice.	A whole-of-building, whole-of-life Life Cycle Assessment (LCA) is to be conducted for the proposed buildings, demonstrating a reduction of environmental impacts against a reference building. Building materials used in the construction will be assessed, including concrete, steel, timber and PVC, with a push to incorporate use of recycled and re-used	Architect / Services Consultant	Design Development

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
		materials. Additionally, an extensive solar array will have operational energy improvements throughout the life cycle of the development.		

2.5 Places

The 'Places' category focuses on the integration of buildings into the urban fabric and delivering places that increase social cohesion. The category investigates the building's impact on the wider surroundings, maximising the positive impacts whilst limiting negative ones. Importantly, the category celebrates our Aboriginal and Torres Strait Islander communities and uses placemaking to give a sense of belonging to the spaces we spend time at.

The proposed development 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 considers the number of facilities within close proximity, and public transit based on distance and type of nearby transit lines. Numerical scores of between 0 and 100 for the following two aspects are provided:

- Walk Score: 0 being heavily car dependent 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.
- Transit Score: 0 being the location only provides minimal transit while 100 reflecting a location that is well served by public transport.

The proposed development in Rosanna achieves a Walk score of 77 out of 100 – "Very Walkable" and a Transit Score of 65 out of 100 – "Good Transit", which indicate that the building staff, visitors and residents can complete most daily errands without on foot, and the transit is convenient for most trips.

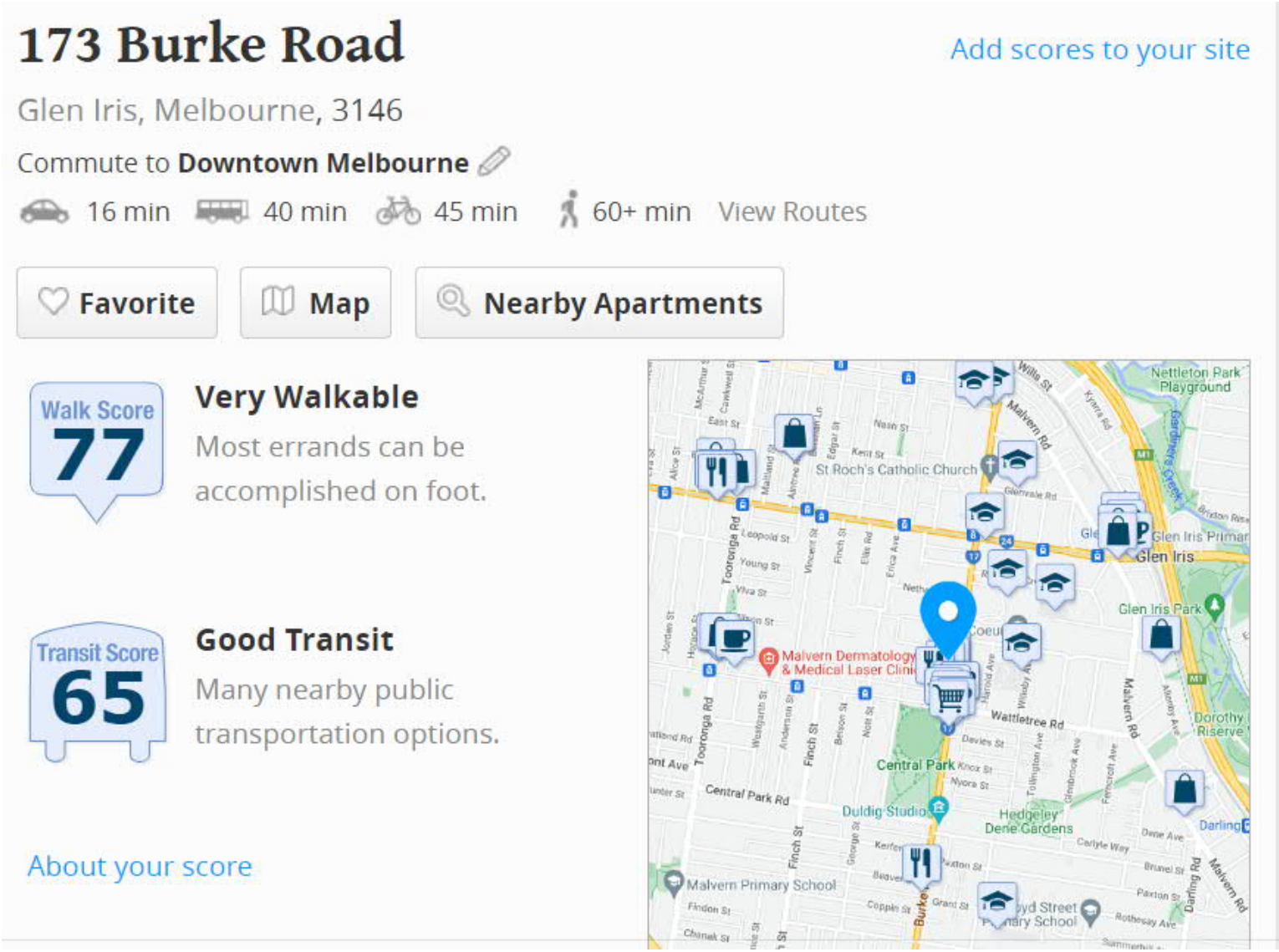

Figure 6: Walk Score Results.

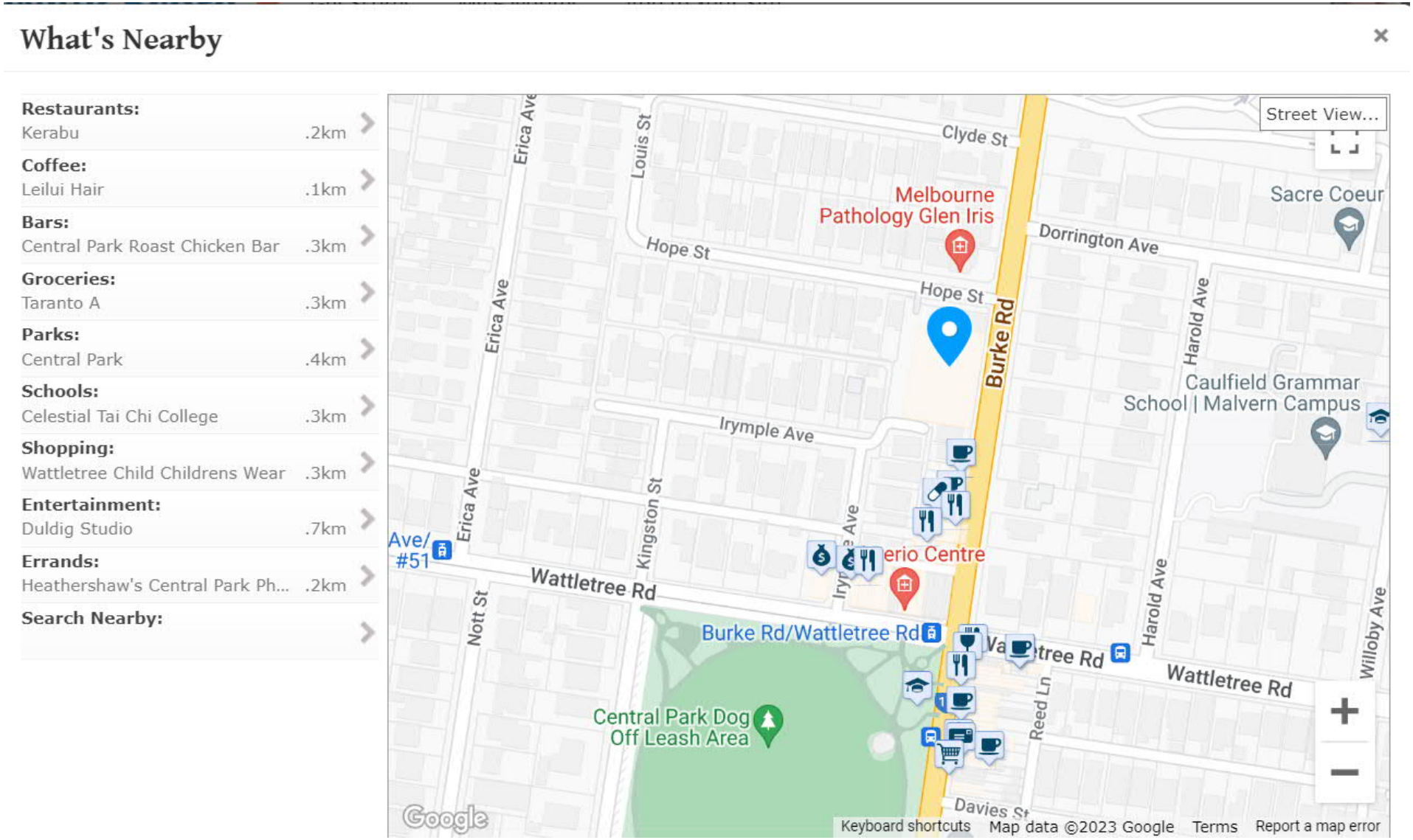

Figure 7: Walk Score map showing amenities surrounding the proposed development. (Source: walkscore.com)

<table>
<tr><th>Credit Name</th><th>Credit Requirement</th><th>Project Response</th><th>Responsibility & Implementation</th><th>Project Stage</th></tr>
<tr>
<td>27 - Movement and Place
Transport</td>
<td>Minimum Expectation

The building must include showers and changing facilities for occupants. The number of showers required is based on the regular occupancy of the building:

<table>
<tr><td>Occupants</td><td>Shower</td></tr>
<tr><td>0-49</td><td>1 Unisex</td></tr>
<tr><td>50-99</td><td>2</td></tr>
<tr><td>100-200</td><td>4</td></tr>
<tr><td>200+</td><td>Additional 1 per 200 occupants above 200</td></tr>
</table>

They must be accessible, inclusive, and located in a safe and protected space.

One locker must be provided for every eight regular building occupants or staff. The lockers must be secure and located in the changing rooms.</td>
<td>In addition to showers and lockers for the retail component, the building will minimise car dependency and private vehicle use through promoting walking, cycling and public transport in that order.

To enhance the development’s ability to reduce vehicle emissions, five carparking spaces will be provided with electric vehicle charging infrastructure (minimum 7kW 32A Type 2 charger). This will encourage building users to consider purchasing electric vehicles by making their use more convenient.

The design of charging infrastructure should take into consideration requirements for further expansion to more spaces as electric vehicles become more prevalent, in line with NCC 2022 Clause J9D4.

Bicycle parking is as follows:

<u>173 Burke Road</u>

49 residential bike parking spaces, 14 retail staff bike parking space and 16 retail visitor bike parking spaces on basement level; and

16 retail visitor and 6 residential visitor bike parking spaces on ground level.

<u>28 Hope Street</u>

6 residential bike parking spaces and 6 visitor bike parking spaces on ground level</td>
<td>Architect</td>
<td>Design Development</td>
</tr>
</table>

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
		Additionally, according to the minimum requirement of Green Star Building, one additional shower (as an addition to the shower required to meet statutory accessibility requirement) must be provided if the regular occupancy of the proposed non- residential component is between 0-49 and two additional showers for 50-99 regular occupancy. One locker will be provided for every eight regular building occupants or staff. The lockers must be secure and will be located in the end of trip facility on Basement level 2. Upon accessing, pedestrians and cyclists must be protected from the elements and other vehicles. Access must be safe, with consideration given to avoiding steep gradients, surface grip levels, and visibility around tight corners. Access to the facilities must be well lit between entryway to bike parking, all amenities and lift lobbies and main access points to the building. All regular building occupants or staff must have easy access to lockers, showers, and building entry. Occupants must be able to find the facilities thanks to clear signage throughout the building and access points.		

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
Transport	The proposed development has direct access within 1km walking distance to the following public transport options: Train Line: • Glen Iris Railway Station: Glen Waverley Line Tram Lines: • 5: Melbourne University – Malvern (Burke Road) • 6: Moreland – Glen Iris Bus Lines: • 624: Kew - Oakleigh • 612: Chadstone SC – Box Hill • 734: Glen Iris – Glen Waverley		Inherent in Location	

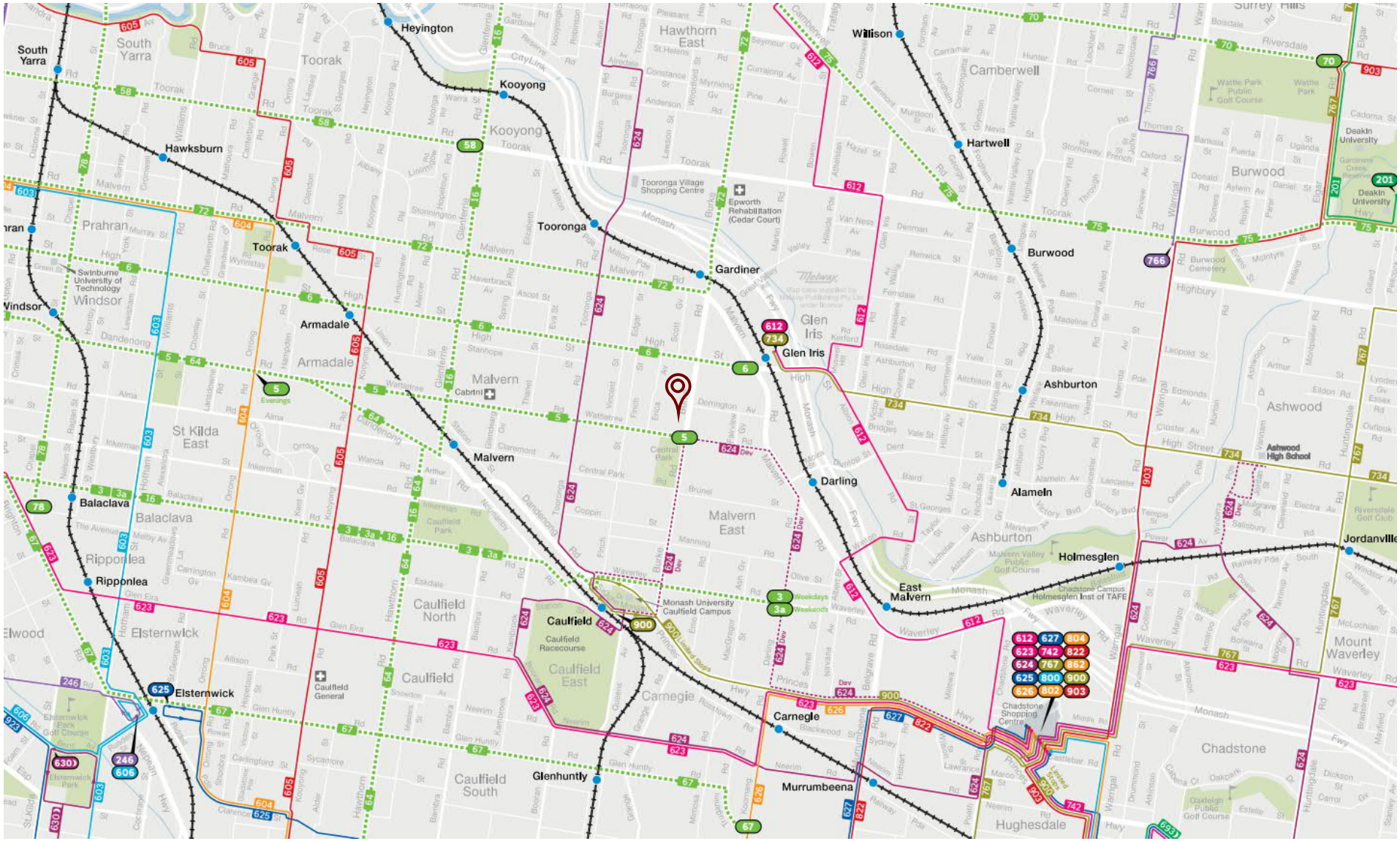

Figure 8: PTV Local Area Map indicating the public transport options surrounding the site (marked by the red balloon. Source: ptv.vic.gov.au)

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
28 – Enjoyable Places *Urban Ecology*	*Credit Achievement (2 points)* The project must provide new, publicly accessible spaces that are enjoyable and support community activity and interaction, at a size of 1.75m^2/dwelling. Additionally, an activation strategy must be provided to ensure placemaking continues after practical completion. The strategy must demonstrate how the future occupants and the wider community can contribute to the place activation.	The proposed development features an outdoor communal terrace (341m^2) and 87m^2 residential lobby that can accommodate community-based activities of diverse capacities, such as children's activities and social gathering. An activation strategy will be completed, outlining the targets of activities, management of funds, potential initiators community encouragement plans and more.	Architect	Design Development

2.6 People

The 'People' category encourages solutions that improve environmental and social outcomes beyond the project boundary. It highlights issues such as diversity and gender equity, inclusion, and mental health.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
34 – Design for Inclusion	*Credit Achievement (2 points)* To be compliant, the building's design and construction must be able to be navigated and enjoyed by stakeholders of diverse ages, genders, and physical and mental abilities. This applies to common spaces, bathroom facilities, and amenities provided within the building. This must include: • Equal access to the building: Provide equitable, appealing, safe, and secure access in a manner that does not segregate or stigmatise users through all principal entrance points and main thoroughfares inside and	Woolworth tenancy will introduce parents, family restrooms, emergency rooms, quiet rooms and social interaction rooms accessible to all users.	Builder	Construction

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
	outside the building. • Diverse wayfinding: Introduce visual, physical, olfactory, and auditory solutions to help individuals navigate the site in a safe and enjoyable manner. • Inclusive spaces: Introduce internal and external spaces for a diverse range of users, including parents, family restrooms, emergency rooms, quiet rooms, and social interaction rooms. These rooms must be accessible to all users.			

Figure 9: Example of Parents Room and Family Restroom.

2.7 Nature

The 'Nature' category aims to protect, minimise impacts on and enhance value of ecology and biodiversity. The category also aims to connect natural networks by creating links between native or built corridors and manage off-site natural spaces to restore the impact to nature from the development.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
35 – Impacts to Nature *Urban Ecology*	*Minimum Expectation* The building must not be built on, or significantly impact, a site with high ecological value. Light pollution to both neighbouring bodies and the night sky must be minimised. The project team must demonstrate that all outdoor lighting on the project complies with AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting and either the upward light output ratio (ULOR) or direct illuminance is controlled.	The development is not being built on a site with high ecological value. All external lighting in the development will comply with requirements and will not shine into the night sky or towards a neighbour. No external luminaire on the project will have an Upward light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation.	Developer/Electrical Engineer	Design Development



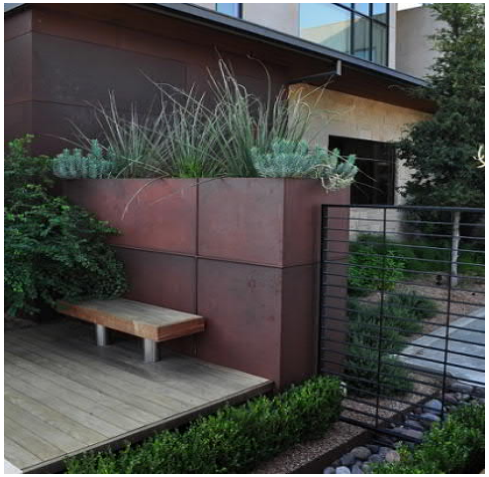

Figure 10: Examples of drought tolerant landscaping that could be incorporated into the development design.

2.8 Leadership Challenges

The ‘Leadership Challenges’ category aims to promotes achievements that are considered leading practice in Australia.

Credit Name	Credit Requirement	Project Response	Responsibility & Implementation	Project Stage
41 – Leadership Challenge	*A leadership challenge point is automatically awarded to the building for a total of 15 points for Climate Positive Pathway*	-	Developer	Design Development

3. Conclusion

As set out in this SMP the proposed mixed-use development at 173 Burke Road and 28 Hope Street, Glen Iris, will aim to achieve a 5 Star Green Star Buildings benchmark. This will be achieved through the initiatives outlined in this report including the use of energy efficient systems, rainwater tank, solar PV and the use of low carbon and zero VOC content materials, as well as reduced environmental impacts during the construction stage.

The initiatives that have been included within this SMP all have a proven track record of serving their individual purpose and can be easily maintained with any failures obvious to the occupants and building management. 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 building.

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

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

Appendix 1 – Green Star Buildings Scorecard

greenstar Buildings

Submission planner

Summary

Climate Positive Pathway

Registering from / certified	2023 onwards	Desired Green Star rating	5 Star

Green Star rating

Core points targeted	37	Minimum expectations met	Yes
Leadership points targeted	1	Green Star rating targeted	5 Star
Total points targeted	38	Climate Positive Pathway met	Yes

	Credit	Minimum Expectation	Credit Achievement	Exceptional Performance	Total points available	Targeted performance level	Total points targeted	Comments
Responsible					**17**			
1	Industry Development		1		1	Credit Achievement	1	
2	Responsible Construction	•	1		1	Credit Achievement	1	
3	Verification and Handover	•	1		1	Credit Achievement	1	
4	Operational Waste	•			0	Minimum Expectation	•	
5	Responsible Procurement		1		1	Credit Achievement	1	
6	Responsible Structure		3	2	5	Credit Achievement	3	
7	Responsible Envelope		2	2	4	Credit Achievement	2	
8	Responsible Systems		1	1	2		0	
9	Responsible Finishes		1	1	2	Credit Achievement	1	
						Total	10	
Healthy					**14**			
10	Clean Air	•	2		2	Credit Achievement	2	
11	Light Quality	•	2	2	4	Minimum Expectation	•	
12	Acoustic Comfort	•	2		2	Minimum Expectation	•	
13	Exposure to Toxins	•	2		2	Credit Achievement	2	
14	Amenity and Comfort		2		2		0	
15	Connection to Nature		1	1	2		0	
						Total	4	
Resilient					**8**			
16	Climate Change Resilience	•	1		1	Credit Achievement	1	
17	Operations Resilience		2		2	Credit Achievement	2	
18	Community Resilience		1		1		0	
19	Heat Resilience		1		1		0	
20	Grid Resilience		3		3		0	
						Total	3	
Positive					**30**			
21	Upfront Carbon Emissions	•	3	3	6	Credit Achievement	3	
22	Energy Use	•	3	3	6	Credit Achievement	3	
23	Energy Source	•	3	3	6	Exceptional Performance	6	
24	Other Carbon Emissions		2	2	4	Credit Achievement	2	
25	Water Use	•	3	3	6	Minimum Expectation	•	
26	Life Cycle Impacts		2		2	Credit Achievement	2	
						Total	16	
Places					**8**			
27	Movement and Place	•	3		3	Minimum Expectation	•	
28	Enjoyable Places		2		2	Credit Achievement	2	
29	Contribution to Place		2		2		0	
30	Culture, Heritage and Identity		1		1		0	
						Total	2	
People					**9**			
31	Inclusive Construction Practices	•	1		1	Minimum Expectation	•	
32	Indigenous Inclusion		2		2		0	
33	Procurement and Workforce Inclusion		2	1	3		0	
34	Design for Inclusion		2	1	3	Credit Achievement	2	
						Total	2	
Nature					**14**			
35	Impacts to Nature	•	2		2	Minimum Expectation	•	
36	Biodiversity Enhancement		2	2	4		0	
37	Nature Connectivity		2		2		0	
38	Nature Stewardship		2		2		0	
39	Waterway Protection		2	2	4		0	
						Total	0	
Leadership					**0**			
40	Market Transformation				0		0	
41	Leadership Challenges				0		1	
						Total	1	

Appendix 2 – Green Star Building Potable Water Calculator

Residential Component

Potable Water, Performance Pathway (18A) - Residential Buildings Only

Links to - Project information:	Building occupancy areas and operation	Water systems checklist	Rainfall data		
Links to - Water systems:	1 Sanitation	2 Whitegoods	3 Heat rejection	4 Washdown	5 Landscape irrigation
	6 Swimming pools	7 Fire protection systems	8 Process cooling		
Links to - Reclaimed water sources:	Reclaimed water sources	Rainwater collection	Greywater collection	Blackwater collection	Stormwater and off-site reclaimed water supply
Links to - Results:	Total water demand for each system	Total water demand per month	Potable water results	Domestic hot water	Discharge to sewer

Weighted Points Achieved 4.0

Instructions: Enter information into light blue cells

For details on what information is required and how this information is used to calculate the reduction in potable water consumption against the Standard Practice Benchmark, please refer to the Green Star - Potable Water Calculator Guide, available from the GBCA website.

GENERAL

Building occupancy, areas and operation

Space type description	Area (m²)	Peak days of operation (remaining days assumed off-peak)	Occupancy profile	Maximum design occupancy used in water use calculations (m²/person) (Enter manually OR use default)		Percentage of building users who occupy the space continually for periods greater than one hour.
				Proposed Building design occupancy (m2/person)	Default design occupancy (Not applicable for	
Apartments	7,309	7 days a week	Class 1 or 2 Residential	50	Please select	100%
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
Non occupied areas		n/a	n/a			
TOTAL AREA	7,309					

Water systems checklist Please provide responses to the following questions. Detailed inputs will be requested further on in the calculator.

WATER USES - ALL QUESTIONS MUST BE ANSWERED

1. Sanitation

Are fixtures and fittings provided for building occupant sanitation?	Yes
Does the project provide for sports activities?	No
Have showers been installed for post/pre activity use?	Yes

2. Whitegoods

Does the project include any dishwashers or washing machines?	Yes

3. Heat rejection

Does the project utilise water based heat rejection (building cooling)?	No
Does the project have cooling towers?	No
Does the project contain any other water cooled systems that are not conventional	No

4. Washdown

Does the project include washdown areas?	Yes

5. Landscape irrigation

Are there any landscaped areas within the project?	Yes
Are any irrigation systems included in the project?	Yes

6. Swimming pools

Are there any swimming pools within the project?	No

7. Fire protection systems

Does the project include a fire protection system?	Yes

8. Process cooling

Does the project include any water based process cooling?	No

WATER REUSE - ALL QUESTIONS MUST BE ANSWERED

9. Reclaimed water

Does any water collection, reclamation and/or reuse occur on the project site?	Yes
Does the project include rainwater capture and reuse systems?	Yes
Does the project include greywater capture, treatment and reuse systems?	No
Does the project include blackwater capture, treatment and reuse systems?	No
Does the project include other stormwater reuse or an off-site supply of non-potable	No

Rainfall data

Select the average rainfall data location for the project	Melbourne (1998 - 2007) (mm)

1. SANITATION

Water demand from sanitation fixtures and fittings (Annual water demand from fixtures and fittings is calculated using assumed usage rates based on the space types and occupancies entered above. See pages 10-13 of the Green Star - Potable Water Calculator Guide for further details.)

TOILETS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/flush)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/flush)	WELS Star Rating selection				
TOILETS		4 Star	3.5	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	100%	300	343

(The Standard Practice Benchmark is based on 3 StarWELS rated toilets)

URINALS

Are urinals installed?	No
Would urinals normally be installed in the building type?	No

(Note: if "No" is selected, the project team should provide justification within the short report as to why the standard practice building does not have urinals.)

Urinals on auto timer

Enter average L/flush	
Enter number of urinals on autotimer	
Percentage of total number of Urinals	

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
<enter description here>						
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
			Total	0%	0	0

(The Standard Practice Benchmark is based on 3 Star WELS rated urinals)

Total must add to 100%

INDOOR TAPS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
TAPS		5 Star	6.0	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	100%	84	105

(The Standard Practice Benchmark is based on 4 Star WELS rated taps)

SHOWERS - OCCUPANTS

Shower demand by occupants (reference)	100%
Shower demand by occupants (current)	100%

For residential buildings: Enter 100% for both "reference" and "current" shower demand
For other building Types: Use the reference and proposed building bicycle accommodation percentage from the Sustainable Transport Calculator, or percentages determined under 17.B.4 'Active Transport Facilities' criterion to determine the number of building occupants that are likely to shower each day.

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
SHOWERS		3 Star	9.0	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
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<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	100%	2,038	2,038

(The Standard Practice Benchmark is based on 3 Star WELS rated showers)

SHOWERS - SPORTS FACILITIES

Indicate the number of people expected to participate in sporting activities each day. (Use an average based on weekly figures if required)	
Indicate the number of days/year that the sports facilities are in use	

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	0%	0	0

(The Standard Practice Benchmark is based on 3 Star WELS rated showers)

RESULTS: WATER DEMAND FROM FITTINGS

	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
Toilets	300	343
Urinals	0	0
Indoor Taps	84	105
Showers - Occupants	2,038	2,038
Showers - Sports Facilities	0	0
TOTAL	2,423	2,486

Total must add to 100%

2. WHITE GOODS

Water demand from washing machines

The project team is to provide documentary evidence in accordance with the water calculator guide and technical manual to substantiate the number of cycles per year. Otherwise, leave blank and a default value will be applied.

WASHING MACHINES

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Machine capacity (kg)	Water efficiency used in calculations (L/kg)	Number of each type	Number of cycles per year (leave blank if unknown)	Proportion of water per cycle that is sourced from DHW (%)	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/kg)	WELS Star Rating selection							
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
				Total	0			0	0

Water demand from dishwashers

DISHWASHERS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Machine capacity (number of place settings)	Water efficiency used in calculations (L/cycle)	Number of each type	Number of cycles per year (leave blank if unknown)	Proportion of water per cycle that is sourced from DHW (%)	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/cycle)	WELS Star Rating selection							
DISHWASHERS		5 Star	14	11.5	64			269	360
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
				Total	64			269	360

3. HEAT REJECTION

This section requires outputs from the energy simulation undertaken for Conditional Requirement and Greenhouse Gas Emissions (Credit 15).

GENERAL INFORMATION

Proposed Building

Site elevation (m above sea level)	
Maximum combined cooling tower air flow (L/s)	
Peak building cooling load (kW)	

Standard Practice Building

Select one of the following building types:	
Standard Practice HVAC system type assumed for Energy and Water Category	
Maximum combined cooling tower air flow (L/s)	
Peak building cooling load (kW)	

Water demand from cooling towers

The project team has indicated that there are no water based heat rejection systems included in the project. Please complete the Standard Practice cooling load.

Please enter the average air temperature, relative humidity and heat rejection load for the standard practice building.

EVAPORATION

Month	Proposed Building monthly cooling load (kWh/month)	Average dry bulb temperature (°C)	Average relative humidity (%)	Standard Practice Building monthly cooling load (kWh/month)
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Visit the Bureau of Meteorology's website to obtain average dry bulb and relative humidity data relevant to your site:
http://www.bom.gov.au/climate/averages.shtml?bookmark=cu
n

DRIFT

	Proposed Building	Standard Practice Building	
Condenser Water Δt (°C)			(as per the requirements of the Greenhouse Gas Emissions Calculator Guide)
Drift coefficient (%)			(as required in AS3666.1 clause 4.4)

BLEED

	Proposed building	Standard Practice Building	
Cycles of concentration			Standard practice cycles of concentration

	Proposed Building				Standard Practice Building			
Month	Evaporation (kL)	Drift (kL)	Bleed (kL)	TOTAL kL/month	Evaporation (kL)	Drift (kL)	Bleed (kL)	TOTAL kL/month
January				0	0	0	0	0
February				0	0	0	0	0
March				0	0	0	0	0
April				0	0	0	0	0
May				0	0	0	0	0
June				0	0	0	0	0
July				0	0	0	0	0
August				0	0	0	0	0
September				0	0	0	0	0
October				0	0	0	0	0
November				0	0	0	0	0
December				0	0	0	0	0
Total (kL/year)	0	0	0	0	0	0	0	0

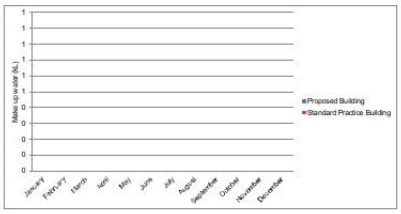
Water demand from heat rejection systems that are not conventional cooling towers **THE PROJECT TEAM HAS INDICATED THAT**

Please proceed to following section.

Month	Water demand per month (kL/month)
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
Total make up water (kL/year)	0

RESULTS: WATER DEMAND FROM HEAT REJECTION

Month	Proposed Building (kL)	Standard Practice Building (kL)
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
Total make up water (kL/year)	0	0



4. WASHDOWN

Washdown hoses

Description	Hose Flowrate (L/min)	Number of Hoses	Average daily use (minutes)	Proposed consumption (kL/day)	Standard Practice consumption (kL/day)
BIN WASHDOWN	15.0	1	2	0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
			Total	0	0

5. LANDSCAPE IRRIGATION

(The irrigation requirement for the site is calculated for each month of the year, for each landscaped 'zone' in the site (a zone being a landscaped area that has the same soil type, irrigation system and as far as possible, types of plants). Please see pages 17-22 of the Green Star - Calculator Guide for further details.)

Climate data

Month	Rainfall (mm)	Evapotranspiration (point potential) (mm)
January	33.6	156.3
February	50.2	123.5
March	26.3	101.6
April	50.0	61.7
May	39.3	46.4
June	40.9	42.8
July	36.3	47.6
August	45.1	51.8
September	41.6	95.9
October	55.2	109.3
November	50.2	122.7
December	53.0	53.3

Landscape zones

Name and description	Area of zone (m^2)	Percentage of zone undercover (%)	Weighted average crop coefficient in zone	Common irrigation systems water application efficiency	User determined application efficiency
COMMUNAL GARDENS	328	42%	0.450	Subsurface drip (SDI) (90%)	
Remaining Landscaped Area	247	10%	0.450	Subsurface drip (SDI) (90%)	
				Please select	
				Please select	
				Please select	
				Please select	
				Please select	
				Please select	
				Please select	
				Please select	
Standard practice landscape irrigation assumptions:	(Same as Proposed Building)	(Same as Proposed Building)	(0.6)	(75%)	

RESULTS: WATER DEMAND FROM IRRIGATION

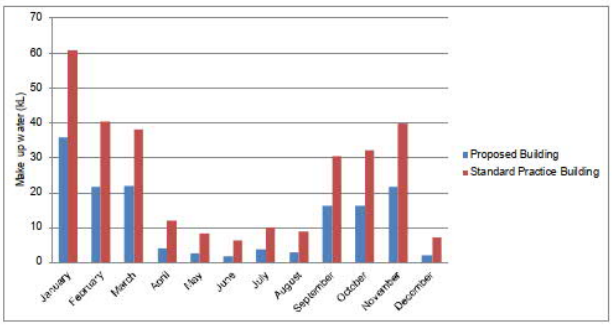
Landscape irrigation requirements per zone

Note: The irrigation requirement for a particular zone will only be computed once every field related to that zone has been completed in the table above.

Zone name and description	Proposed Building (kL)	Standard Practice Building (kL)
COMMUNAL GARDENS	100	186
Remaining Landscaped Area	50	107
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
Total	150	294

Landscape irrigation requirements per month

Month	Proposed Building (kL)	Standard Practice Building (kL)
January	36	61
February	22	40
March	22	38
April	4	12
May	3	8
June	2	6
July	4	10
August	3	9
September	16	30
October	16	32
November	21	40
December	2	7
Total	150	294



6. SWIMMING POOLS

GENERAL INFORMATION

Is the swimming pool outdoor or indoor	
Enter the project height above sea level (m)	
Is a pool cover provided	
Enter the volume of the swimming pool (m^3)	
Enter the surface area of the swimming pool (m^2)	
Enter the annual **minimum** pool hall exhaust air volume based on the requirements of AS1668.2 (m^3)	
Enter the annual proposed design pool hall exhaust air volume (m^3)	
Enter the average pool hall temperature while pool exhaust is operating	
Enter the water consumption for filter cleaning (backwash) (L)	
Enter the number of times/year that filter cleaning will take place	

CLIMATE DATA

Enter climate data relevant to the project location

Month	Rainfall (mm)	Evapotranspiration (point potential) (mm)

Reference swimming pool water consumption (L/day)	0
Proposed swimming pool water consumption (L/day)	0

Visit the Bureau of Meteorology's website to obtain rainfall and evapotranspiration data relevant to your site:
http://www.bom.gov.au/climate/data/index.shtml

7. FIRE PROTECTION SYSTEMS

Is the building required under part E of the National Construction Code (formerly the Building Code of Australia) to have sprinklers installed as part of its fire protection system?	Yes
Does the building's sprinkler system discharge water during testing?	Yes
Is greater than 80% of discharged water captured for reuse?	Yes
Testing frequency (enter number of tests per year)	1
Volume discharged per test (L)	1,000,000
Proportion of water captured per test (%)	80%
Requirements met	Yes

8. PROCESS COOLING

Is all water based process cooling provided by closed loop systems?	

The following information is only required for open loop process cooling systems

Evaporation losses (L/day)	
Water discharged to sewer (L/day)	
Percentage of open loop process cooling water demand sourced from non-potable (reclaimed) water	

RECLAIMED WATER

Reclaimed water sources

Note: All systems entered into this calculator must comply with local EPA requirements.

DISTRIBUTION OF WATER SOURCES

Water fittings / systems	Percentage of fittings/systems connected to the following water sources				
	Rainwater	Greywater	Blackwater	Stormwater recycling or other off-site reclaimed water	Mains water only (this column must be completed - enter a figure between 0% and 100% for each water system)
Toilets	100%				0%
Urinals					100%
Indoor taps					100%
Showers - occupants					100%
Showers - sports					100%
Laundries					100%
Dishwashers					100%
Heat rejection					100%
Washdown					100%
Landscape irrigation	57%				43%
Fire protection systems					100%
Swimming pools					100%
Process cooling					100%

Note:

- Where fittings or systems are supplied with water from more than one source, it is assumed that the they are first supplied with water from any greywater and blackwater systems, followed by rainwater, stormwater and off-site reclaimed water systems.

- If there is insufficient rain/grey/black water to service the indicated percentage of each water use, mains water will applied by the calculator to make up the difference.

WATER DEMAND FROM OTHER WATER SYSTEMS (NOT INCLUDED IN THE CALCULATOR) WHICH ARE COMPLETELY OR PARTIALLY SOURCED BY RECLAIMED WATER

Note: The demand for reclaimed water from water uses assessed under other credits will be met before any water uses assessed under the Potable Water Credit.

Month	Water demand (kL)		
	<Enter description of any other uses of rainwater or re-used water>	<Enter description of any other uses of rainwater or re-used water>	<Enter description of any other uses of rainwater or re-used water>
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Note: This table only needs to be filled in if reclaimed water is used to meet the demand of these end uses.

If reclaimed water is not used for these end uses, leave these cells blank.

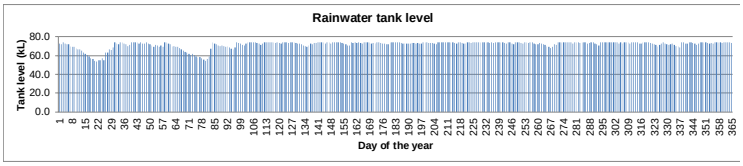
When reclaimed water is used, enter the total demand for each month regardless of whether it is fully or partially met by the reclaimed water supply. In the table below, the percentage of the demand met by reclaimed water/connected to the reclaimed water supply is entered.

DISTRIBUTION OF WATER SOURCES FOR OTHER WATER SYSTEMS

Water system	Rainwater	Greywater	Blackwater	Stormwater recycling or other off-site reclaimed water	Mains water only (this column must be completed - enter a figure between 0% and 100% for each water use)
<Enter description of any other uses of rainwater or re-used water>					
<Enter description of any other uses of rainwater or re-used water>					
<Enter description of any other uses of rainwater or re-used water>					

Rainwater collection

Rainfall collection area (m2)		2,867
Run-off co-efficient	Flat roof without gravel	0.8
Storage capacity (kL)		74
Rainwater tank reliability %		100%



Greywater collection

Water system	% discharge water collected for re-use
Toilets	
Urinals	
Indoor taps	
Showers - occupants	
Showers - sport	
Washing machines	
Dishwashers	
Cooling tower bleed +other heat rejection	
Washdown	
Fire protection systems	
Swimming pools	
Process cooling	

OTHER WATER SOURCES e.g. Chiller condensate, cooling tower washdown or sewer mining etc...

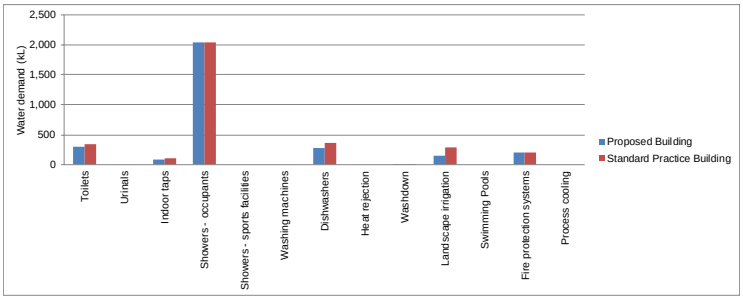
Month				Total collected (kL)

WATER DEMAND SUMMARY

Total water demand summary for each system and per month

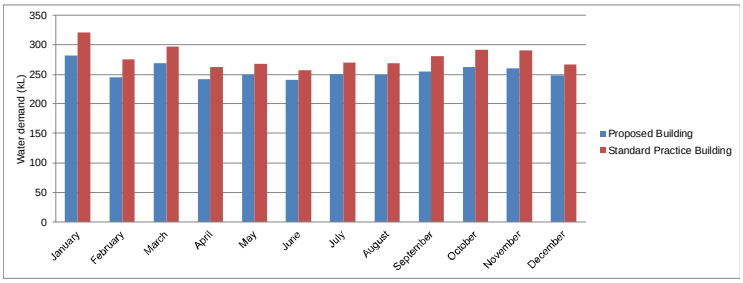
TOTAL WATER DEMAND FOR EACH SYSTEM

Water system	Proposed Building (kL)	Standard Practice Building (kL)
Toilets	300	343
Urinals	0	0
Indoor taps	84	105
Showers - occupants	2,038	2,038
Showers - sports facilities	0	0
Washing machines	0	0
Dishwashers	269	360
Heat rejection	0	0
Washdown	11	9
Landscape irrigation	150	294
Swimming Pools	0	0
Fire protection systems	200	200
Process cooling	0	0
Total	3,053	3,349



TOTAL WATER DEMAND PER MONTH

Month	Proposed Building (kL)	Standard Practice Building (kL)
January	282	320
February	244	275
March	269	298
April	243	263
May	249	268
June	240	257
July	250	269
August	249	268
September	255	281
October	263	292
November	260	291
December	249	266
Total	3,053	3,349



POTABLE WATER RESULTS

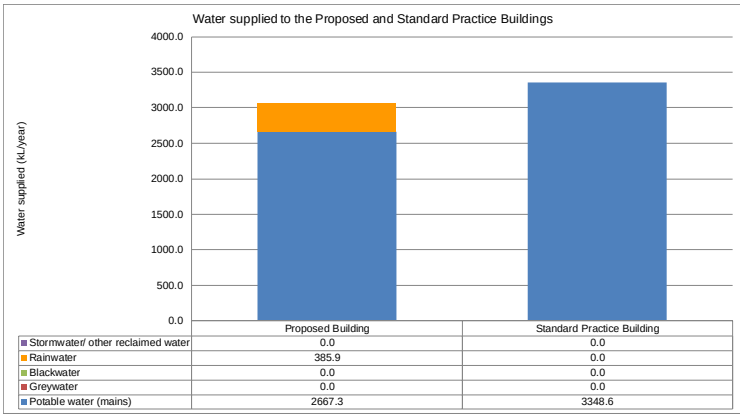
	Proposed Building						Standard Practice Building
Month	Total water demand	Rainwater used to meet demand	Greywater used to meet demand	Blackwater used to meet demand	Stormwater and off-site reclaimed water used	Potable water demand	Potable water demand
January	282	46	0	0	0	236	320
February	244	35	0	0	0	209	275
March	269	38	0	0	0	231	298
April	243	27	0	0	0	216	263
May	249	27	0	0	0	222	268
June	240	26	0	0	0	215	257
July	250	28	0	0	0	223	269
August	249	27	0	0	0	222	268
September	255	34	0	0	0	221	281
October	263	35	0	0	0	228	292
November	260	37	0	0	0	223	291
December	249	27	0	0	0	222	266
Total	3,053	386	0	0	0	2,667	3,349

Percentage reduction in Potable Water Consumption compared to the Standard Practice Building	**20%**

Points Achieved - General	**3.0**
Points Achieved - Fire protection systems	**1**
Points Achieved - Process cooling	**N/A**

POINTS ALLOCATION

Percentage reduction compared to Standard Practice building	kL/year	Points awarded
0%	3,349	0.0
8%	3,097	1.1
15%	2,846	2.2
23%	2,595	3.3
30%	2,344	4.4
38%	2,093	5.5
45%	1,842	6.6
53%	1,591	7.7
60%	1,339	8.8
68%	1,088	9.9
75%	837	11.0



Outputs from this calculator required for Ene-Conditional Requirement and Credit 15: Greenhouse Gas Emissions.

The annual domestic hot water usage figures determined in this calculator must be used in the energy modelling required for Ene-Conditional Requirement and Credit 15: Greenhouse Gas Emissions to estimate the domestic hot water energy requirement of the Proposed and Standard Practice Buildings. For more details see the Green Star - Greenhouse Gas Emissions Calculator Guide, available www.gbca.org.au

The estimates of annual hot water consumption usage of the Proposed Building are based on the water efficiency of the fittings entered into this calculator. The estimates for the Standard Practice Building are based on the Standard Practice Building's fittings - for further details see the Green Star - Potable Water Calculator Guide, available www.gbca.org.au.

NOTE: THESE FIGURES CAN ONLY BE USED IF the "Building input, areas and operation" and "Water consumption due to fittings" sections of THIS CALCULATOR are COMPLETED

	Proposed Building	Standard Practice Building
Annual Domestic Hot Water Usage (kL/year)	1,061	1,072

Non-Residential Component

Potable Water, Performance Pathway (18A) - All projects, except Hotels & Residentials

Links to - Project information:	Building occupancy, areas and operation	Water systems checklist	Rainfall data		
Links to - Water systems:	1. Sanitation	2. Whitegoods	3. Heat rejection	4. Washdown	5. Landscape irrigation
	6. Swimming pools	7. Fire protection systems	8. Process cooling		
Links to - Reclaimed water sources:	Reclaimed water sources	Rainwater collection	Greywater collection	Blackwater collection	Stormwater and off-site reclaimed water supply
Links to - Results:	Total water demand for each system	Total water demand per month	Potable water results	Domestic hot water	Discharge to sewer

Weighted Points Achieved	4.0

Instructions: Enter information into light blue cells

For details on what information is required and how this information is used to calculate the reduction in potable water consumption against the Standard Practice Benchmark, please refer to the Green Star - Potable Water Calculator Guide, available from the GBCA website.

GENERAL

Building occupancy, areas and operation

Space type description	Area (m²)	Peak days of operation (remaining days assumed off-peak)	Occupancy profile	Maximum design occupancy used in water use calculations (m²/person) (Enter manually OR use default)		Percentage of building users who occupy the space continually for periods greater than one hour.
				Proposed Building design occupancy (m2/person)	Default design occupancy (Not applicable for residential areas)	
Retail	2,632	7 days a week	Retail	5	Please select	7%
Food & Beverage	125	7 days a week	Retail	5	Please select	20%
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
Non occupied areas		n/a	n/a			
TOTAL AREA	2,757					

Water systems checklist Please provide responses to the following questions. Detailed inputs will be requested further on in the calculator.

WATER USES - ALL QUESTIONS MUST BE ANSWERED

1. Sanitation

Are fixtures and fittings provided for building occupant sanitation?	Yes
Does the project provide for sports activities?	No
Have showers been installed for post/pre activity use?	No

2. Whitegoods

Does the project include any dishwashers or washing machines?	Yes

3. Heat rejection

Does the project utilise water based heat rejection (building cooling)?	No
Does the project have cooling towers?	No
Does the project contain any other water cooled systems that are not conventional	No

4. Washdown

Does the project include washdown areas?	Yes

5. Landscape irrigation

Are there any landscaped areas within the project?	No
Are any irrigation systems included in the project?	No

6. Swimming pools

Are there any swimming pools within the project?	No

7. Fire protection systems

Does the project include a fire protection system?	Yes

8. Process cooling

Does the project include any water based process cooling?	No

WATER REUSE - ALL QUESTIONS MUST BE ANSWERED

9. Reclaimed water

Does any water collection, reclamation and/or reuse occur on the project site?	Yes
Does the project include rainwater capture and reuse systems?	Yes
Does the project include greywater capture, treatment and reuse systems?	No
Does the project include blackwater capture, treatment and reuse systems?	No
Does the project include other stormwater reuse or an off-site supply of non-potable	No

Rainfall data

Select the average rainfall data location for the project	Melbourne (1998 - 2007) (mm)

1. SANITATION

Water demand from sanitation fixtures and fittings (Annual water demand from fixtures and fittings is calculated using assumed usage rates based on the space types and occupancies entered above. See pages 10-13 of the Green Star - Potable Water Calculator Guide for further details.)

TOILETS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/flush)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/flush)	WELS Star Rating selection				
TOILETS		4 Star	3.5	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	100%	991	1,132

(The Standard Practice Benchmark is based on 3 StarWELS rated toilets)

URINALS

Are urinals installed?	Yes
Would urinals normally be installed in the building type?	Yes

(Note: if "No" is selected, the project team should provide justification within the short report as to why the standard practice building does not have urinals.)

Urinals on auto timer

Enter average L/flush	
Enter number of urinals on autotimer	
Percentage of total number of Urinals	

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
URINALS	0.8	6 Star	0.8	100%		
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
<enter description here>		Select star rating				
			Total	100%	174	435

(The Standard Practice Benchmark is based on 3 Star WELS rated urinals)

INDOOR TAPS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
TAPS		5 Star	6.0	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	100%	490	612

(The Standard Practice Benchmark is based on 4 Star WELS rated taps)

SHOWERS - OCCUPANTS

Shower demand by occupants (reference)	8%
Shower demand by occupants (current)	8%

For residential buildings: Enter 100% for both "reference" and "current" shower demand
For other building Types: Use the reference and proposed building bicycle accommodation percentage from the Sustainable Transport Calculator, or percentages determined under 17.B.4 'Active Transport Facilities' criterion to determine the number of building occupants that are likely to shower each day.

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
<enter description>		3 Star	9.0	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
			Total	100%	61	61

(The Standard Practice Benchmark is based on 3 Star WELS rated showers)

SHOWERS - SPORTS FACILITIES

Indicate the number of people expected to participate in sporting activities each day. (Use an average based on weekly figures if required)	
Indicate the number of days/year that the sports facilities are in use	

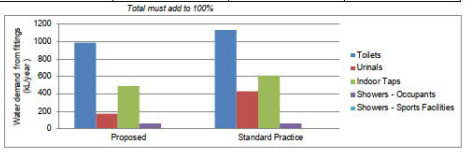
Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
			Total	0%	0	0

(The Standard Practice Benchmark is based on 3 Star WELS rated showers)

Total must add to 100%

RESULTS: WATER DEMAND FROM FITTINGS

	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
Toilets	991	1,132
Urinals	174	435
Indoor Taps	490	612
Showers - Occupants	61	61
Showers - Sports Facilities	0	0
TOTAL	1,716	2,241



2. WHITE GOODS

Water demand from washing machines

The project team is to provide documentary evidence in accordance with the water calculator guide and technical manual to substantiate the number of cycles per year. Otherwise, leave blank and a default value will be applied.

WASHING MACHINES

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Machine capacity (kg)	Water efficiency used in calculations (L/kg)	Number of each type	Number of cycles per year (leave blank if unknown)	Proportion of water per cycle that is sourced from DHW (%)	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/kg)	WELS Star Rating selection							
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
				Total	0			0	0

Water demand from dishwashers

DISHWASHERS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Machine capacity (number of place settings)	Water efficiency used in calculations (L/cycle)	Number of each type	Number of cycles per year (leave blank if unknown)	Proportion of water per cycle that is sourced from DHW (%)	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/cycle)	WELS Star Rating selection							
DISHWASHERS		5 Star	14	11.5	2			8	11
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
<enter description>		Select star rating						0	0
				Total	2			8	11

3. HEAT REJECTION

This section requires outputs from the energy simulation undertaken for Conditional Requirement and Greenhouse Gas Emissions (Credit 15).

GENERAL INFORMATION

Proposed Building

Site elevation (m above sea level)	
Maximum combined cooling tower air flow (L/s)	
Peak building cooling load (kW)	

Standard Practice Building

Select one of the following building types:	
Standard Practice HVAC system type assumed for Energy and Water Category	
Maximum combined cooling tower air flow (L/s)	
Peak building cooling load (kW)	

Water demand from cooling towers — **The project team has indicated that there are no water based heat rejection systems included in the project. Please complete the Standard Practice cooling load.**

Please enter the average air temperature, relative humidity and heat rejection load for the standard practice building.

EVAPORATION

Month	Proposed Building monthly cooling load (kWh/month)	Average dry bulb temperature (°C)	Average relative humidity (%)	Standard Practice Building monthly cooling load (kWh/month)
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Visit the Bureau of Meteorology's website to obtain average dry bulb and relative humidity data relevant to your site:
http://www.bom.gov.au/climate/dataindex.shtml?bookmark=ju

DRIFT

	Proposed Building	Standard Practice Building	
Condenser Water Δt (°C)			(as per the requirements of the Greenhouse Gas Emissions Calculator Guide)
Drift coefficient (%)			(as required in AS3666.1 clause 4.4)

BLEED

	Proposed building	Standard Practice Building	
Cycles of concentration			Standard practice cycles of concentration

	Proposed Building				Standard Practice Building			
Month	Evaporation (kL)	Drift (kL)	Bleed (kL)	TOTAL kL/month	Evaporation (kL)	Drift (kL)	Bleed (kL)	TOTAL kL/month
January				0	0	0	0	0
February				0	0	0	0	0
March				0	0	0	0	0
April				0	0	0	0	0
May				0	0	0	0	0
June				0	0	0	0	0
July				0	0	0	0	0
August				0	0	0	0	0
September				0	0	0	0	0
October				0	0	0	0	0
November				0	0	0	0	0
December				0	0	0	0	0
Total (kL/year)	0	0	0	0	0	0	0	0

Water demand from heat rejection systems that are not conventional cooling towers — **THE PROJECT TEAM HAS INDICATED THAT**

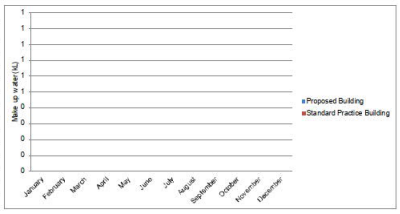
Please proceed to following section.

Month	Water demand per month (kL/month)
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	

December	
Total make up water (kL/year)	0

RESULTS: WATER DEMAND FROM HEAT REJECTION

Month	Proposed Building (kL)	Standard Practice Building (kL)
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
Total make up water (kL/year)	0	0



4. WASHDOWN

Washdown hoses

Description	Hose Flowrate (L/min)	Number of Hoses	Average daily use (minutes)	Proposed consumption (kL/day)	Standard Practice consumption (kL/day)
Bin Wash	15.0	3	10	0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
<enter description>				0	0
			Total	0	0

5. LANDSCAPE IRRIGATION

(The irrigation requirement for the site is calculated for each month of the year, for each landscaped 'zone' in the site (a zone being a landscaped area that has the same soil type, irrigation system and as far as possible, types of plants). Please see pages 17-22 of the Green Star- Calculator Guide for further details.)

Climate data

Month	Rainfall (mm)	Evapotranspiration (point potential) (mm)

Landscape zones

Name and description	Area of zone (m²)	Percentage of zone undercover (%)	Weighted average crop coefficient in zone	Common irrigation systems water application efficiency	User determined application efficiency

RESULTS: WATER DEMAND FROM IRRIGATION

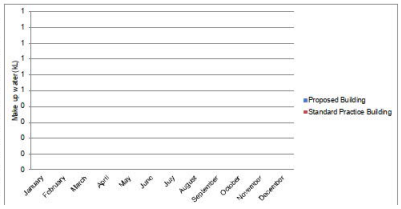
Landscape irrigation requirements per zone

Note: The irrigation requirement for a particular zone will only be computed once every field related to that zone has been completed in the table above.

Zone name and description	Proposed Building (kL)	Standard Practice Building (kL)
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
Total	0	0

Landscape irrigation requirements per month

Month	Proposed Building (kL)	Standard Practice Building (kL)
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
Total	0	0



6. SWIMMING POOLS

GENERAL INFORMATION

Is the swimming pool outdoor or indoor	
Enter the project height above sea level (m)	
Is a pool cover provided	
Enter the volume of the swimming pool (m^3)	
Enter the surface area of the swimming pool (m^2)	
Enter the annual **minimum** pool hall exhaust air volume based on the requirements of AS1668.2 (m^3)	
Enter the annual proposed design pool hall exhaust air volume (m^3)	
Enter the average pool hall temperature while pool exhaust is operating	
Enter the water consumption for filter cleaning (backwash) (L)	
Enter the number of times/year that filter cleaning will take place	

Reference swimming pool water consumption (L/day)	0
Proposed swimming pool water consumption (L/day)	0

CLIMATE DATA

Enter climate data relevant to the project location

Month	Rainfall (mm)	Evapotranspiration (point potential) (mm)

Visit the Bureau of Meteorology's website to obtain rainfall and evapotranspiration data relevant to your site:
http://www.bom.gov.au/climate/data/index.shtml

7. FIRE PROTECTION SYSTEMS

Is the building required under part E of the National Construction Code (formerly the Building Code of Australia) to have sprinklers installed as part of its fire protection system?	Yes
Does the building's sprinkler system discharge water during testing?	Yes
Is greater than 80% of discharged water captured for reuse?	Yes
Testing frequency (enter number of tests per year)	1
Volume discharged per test (L)	500,000
Proportion of water captured per test (%)	80%
Requirements met	Yes

8. PROCESS COOLING

Is all water based process cooling provided by closed loop systems?	

The following information is only required for open loop process cooling systems

Evaporation losses (L/day)	
Water discharged to sewer (L/day)	
Percentage of open loop process cooling water demand sourced from non-potable (reclaimed) water	

RECLAIMED WATER

Reclaimed water sources

Note: All systems entered into this calculator must comply with local EPA requirements.

DISTRIBUTION OF WATER SOURCES

Water fittings / systems	Percentage of fittings/systems connected to the following water sources				
	Rainwater	Greywater	Blackwater	Stormwater recycling or other off-site reclaimed water	Mains water only (this column must be completed - enter a figure between 0% and 100% for each water system)
Toilets	100%				
Urinals	100%				
Indoor taps					100%
Showers - occupants					100%
Showers - sports					100%
Laundries					100%
Dishwashers					100%
Heat rejection					100%
Washdown					100%
Landscape irrigation	100%				0%
Fire protection systems					100%
Swimming pools					100%
Process cooling					100%

Note:

- Where fittings or systems are supplied with water from more than one source, it is assumed that the they are first supplied with water from any greywater and blackwater systems, followed by rainwater, stormwater and off-site reclaimed water systems.

- If there is insufficient rain/grey/black water to service the indicated percentage of each water use, mains water will applied by the calculator to make up the difference.

WATER DEMAND FROM OTHER WATER SYSTEMS (NOT INCLUDED IN THE CALCULATOR) WHICH ARE COMPLETELY OR PARTIALLY SOURCED BY RECLAIMED WATER

Note: The demand for reclaimed water from water uses assessed under other credits will be met before any water uses assessed under the Potable Water Credit.

Month	Water demand (kL)		
	<Enter description of any other uses of rainwater or re-used water>	<Enter description of any other uses of rainwater or re-used water>	<Enter description of any other uses of rainwater or re-used water>
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Note: This table only needs to be filled in if reclaimed water is used to meet the demand of these end uses.

If reclaimed water is not used for these end uses, leave these cells blank.

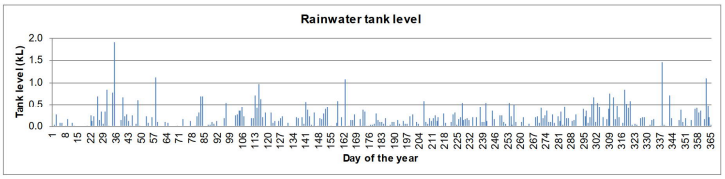
When reclaimed water is used, enter the total demand for each month regardless of whether it is fully or partially met by the reclaimed water supply. In the table below, the percentage of the demand met by reclaimed water/connected to the reclaimed water supply is entered.

DISTRIBUTION OF WATER SOURCES FOR OTHER WATER SYSTEMS

Water system	Rainwater	Greywater	Blackwater	Stormwater recycling or other off-site reclaimed water	Mains water only (this column must be completed - enter a figure between 0% and 100% for each water use)
<Enter description of any other uses of rainwater or re-used water>					
<Enter description of any other uses of rainwater or re-used water>					
<Enter description of any other uses of rainwater or re-used water>					

Rainwater collection

Rainfall collection area (m2)		219
Run-off co-efficient	Flat roof without gravel	0.8
Storage capacity (kL)		6
Rainwater tank reliability %		5%



Greywater collection

Water system	% discharge water collected for re-use
Toilets	
Urinals	
Indoor taps	
Showers - occupants	
Showers - sport	
Washing machines	
Dishwashers	
Cooling tower bleed +other heat rejection	
Washdown	
Fire protection systems	
Swimming pools	
Process cooling	

OTHER WATER SOURCES e.g. Chiller condensate, cooling tower washdown or sewer mining etc...

Month				Total collected (kL)

Blackwater collection

Water system	% discharge water collected for re-use
Toilets	
Urinals	
Indoor taps	
Showers - occupants	
Showers - sport	
Washing machines	
Dishwashers	
Cooling tower bleed +other heat rejection	
Washdown	
Fire protection systems	
Swimming pools	
Process cooling	

Other sources e.g. Chiller condensate, cooling tower washdown or sewer mining etc.

Month				Total collected (kL)

Stormwater and off-site reclaimed water supply

Month	Stormwater collected for re-use (kL)	Off-site reclaimed water supplied to site (kL)

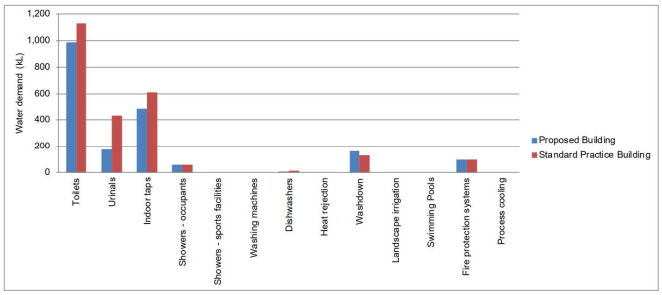
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		

WATER DEMAND SUMMARY

Total water demand summary for each system and per month

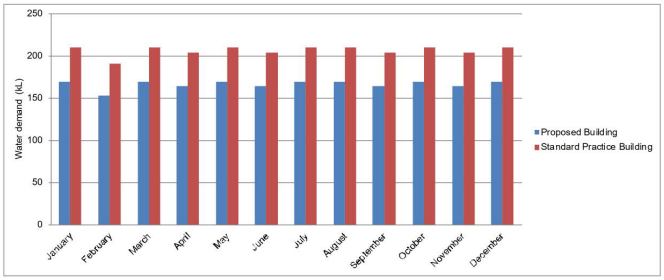
TOTAL WATER DEMAND FOR EACH SYSTEM

Water system	Proposed Building (kL)	Standard Practice Building (kL)
Toilets	991	1,132
Urinals	174	435
Indoor taps	490	612
Showers - occupants	61	61
Showers - sports facilities	0	0
Washing machines	0	0
Dishwashers	8	11
Heat rejection	0	0
Washdown	164	131
Landscape irrigation	0	0
Swimming Pools	0	0
Fire protection systems	100	100
Process cooling	0	0
Total	1,989	2,484



TOTAL WATER DEMAND PER MONTH

Month	Proposed Building (kL)	Standard Practice Building (kL)
January	169	211
February	153	191
March	169	211
April	163	204
May	169	211
June	163	204
July	169	211
August	169	211
September	163	204
October	169	211
November	163	204
December	169	211
Total	1,989	2,484



POTABLE WATER RESULTS

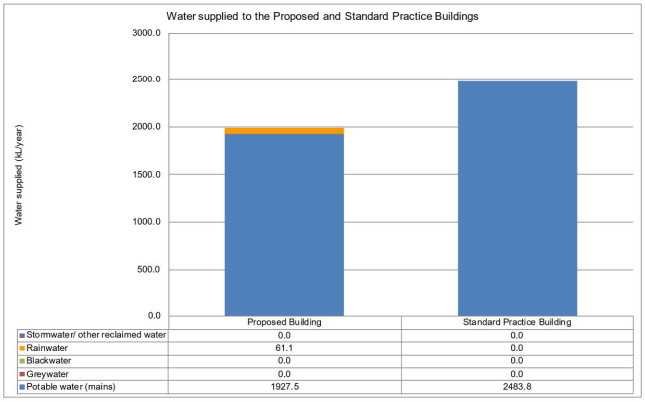
	Proposed Building						Standard Practice Building
Month	Total water demand	Rainwater used to meet demand	Greywater used to meet demand	Blackwater used to meet demand	Stormwater and off-site reclaimed water used	Potable water demand	Potable water demand
January	169	4	0	0	0	165	211
February	153	7	0	0	0	146	191
March	169	3	0	0	0	166	211
April	163	6	0	0	0	157	204
May	169	4	0	0	0	165	211
June	163	5	0	0	0	159	204
July	169	3	0	0	0	166	211
August	169	5	0	0	0	164	211
September	163	4	0	0	0	159	204
October	169	7	0	0	0	162	211
November	163	7	0	0	0	157	204
December	169	7	0	0	0	162	211
Total	1,989	61	0	0	0	1,927	2,484

Percentage reduction in Potable Water Consumption compared to the Standard Practice Building	**22%**

Points Achieved - General	**3.0**
Points Achieved - Fire protection systems	**1**
Points Achieved - Process cooling	**N/A**

POINTS ALLOCATION

Percentage reduction compared to Standard Practice building	kL/year	Points awarded
0%	2,484	0.0
5%	2,360	1.1
15%	2,111	2.2
25%	1,863	3.3
35%	1,614	4.4
45%	1,366	5.5
55%	1,118	6.6
65%	869	7.7
75%	621	8.8
85%	373	9.9
95%	124	11.0



Outputs from this calculator required for Ene-Conditional Requirement and Credit 15: Greenhouse Gas Emissions.

The annual domestic hot water usage figures determined in this calculator must be used in the energy modelling required for Ene-Conditional Requirement and Credit 15: Greenhouse Gas Emissions to estimate the domestic hot water energy requirement of the Proposed and Standard Practice Buildings. For more details see the Green Star - Greenhouse Gas Emissions Calculator Guide, available www.gbca.org.au.

The estimates of annual hot water consumption usage of the Proposed Building are based on the water efficiency of the fittings entered into this calculator. The estimates for the Standard Practice Building are based on the Standard Practice Building's fittings - for further details see the Green Star - Potable Water Calculator Guide, available www.gbca.org.au.

NOTE: THESE FIGURES CAN ONLY BE USED IF the 'Building input, areas and operation' and 'Water consumption due to fittings' sections of THIS CALCULATOR are COMPLETED.

	Proposed Building	Standard Practice Building
Annual Domestic Hot Water Usage (kL/year)	276	337

DISCHARGE TO SEWER

SEWERAGE REDUCTION DUE TO WATER RECYCLING

Percentage reduction in discharge to sewer compared to Standard Practice Building	**20%**

An innovation point may be claimed for a 90% of greater reduction in flow to sewer

Innovation Point Achieved	**0**

Appendix 3 – STORM Assessment & WSUD Report

Objectives

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

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

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

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

Site Characteristics

For the purposes of the stormwater assessment, the development has been delineated into the basic surface types listed below and highlighted in marked-up plans following:

- Total site area: 4,752m² (4,306m² for 173 Burke Road and 446m² for 28 Hope Street)
- Non-trafficable roof catchment area: 2,315m² (2,191m² for 173 Burke Road and 124m² for 28 Hope Street)
- 173 Burke Road level 3 and level 4 trafficable terrace area to rainwater tank for irrigation reuse: 771m²
- Permeable surfaces not located directly above basement carpark: 32m²
- Remaining impervious surfaces: 1,634m²

The design meets the minimum stormwater management requirements of Clause 53.18-5, Standard W2 and Clause 53.18-6, Standard W3. This has been demonstrated via a compliant STORM result detailed below.

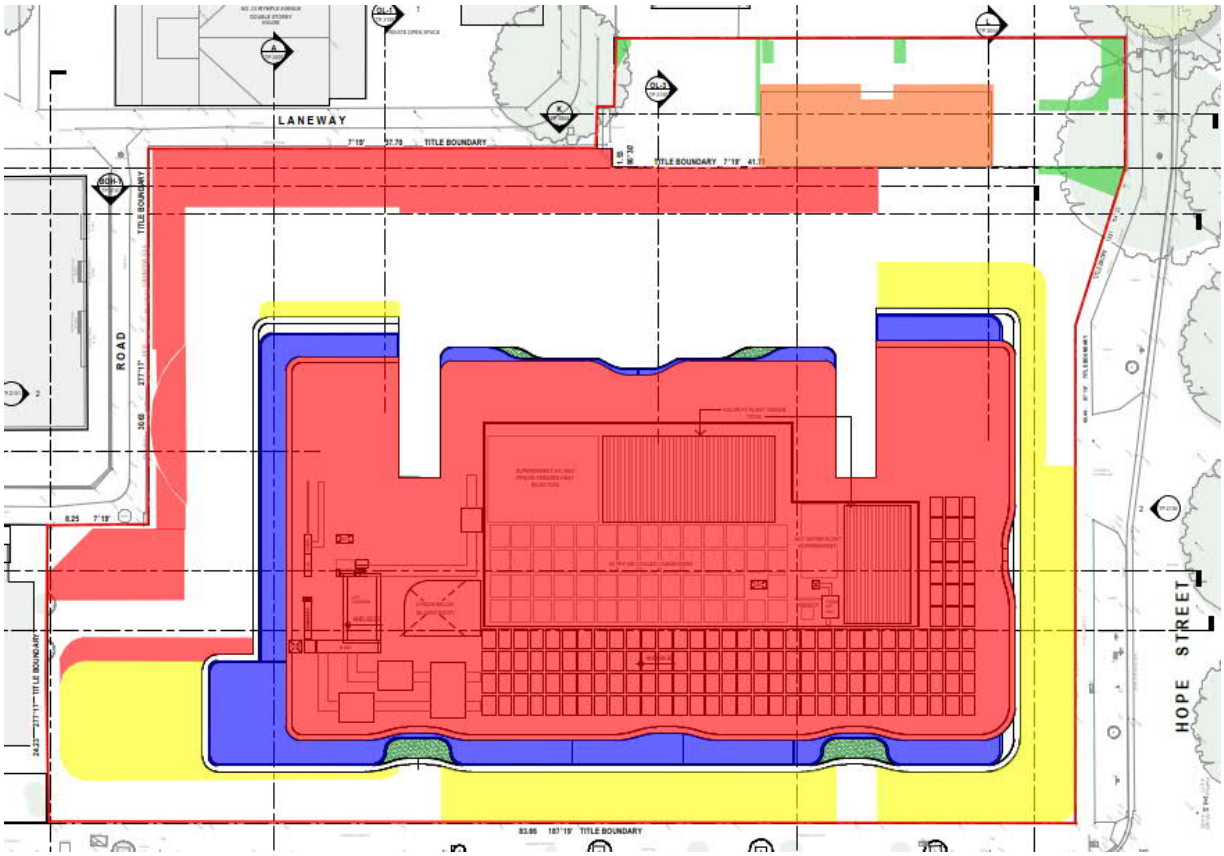


Figure 11: Site delineation.

Stormwater Management Initiatives

Stormwater treatment initiatives will need to be implemented. The following section 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 2: List of areas and their stormwater treatment measures.

Surfaces	Topographic Area (m^2)	Required Treatment
Effective Roof Catchment Area for 173 Burke Road (red area)	2,191m^2	Runoff from the non-trafficable roof area from ground level to Level 4, with a total combined area of 2,191m^2 will be diverted to rainwater tank(s) with a minimum total effective storage capacity of 60,000L. The stored water will be used for toilet flushing for all toilets for the entire building. Overflow from the tank(s) will be diverted to the Legal Point of Discharge (LPD) on site.
Effective Roof Catchment Area for 28 Hope Street (orange area)	124m^2	Runoff from the non-trafficable roof area, with an area of 124m^2 will be diverted to rainwater tank(s) with a minimum total effective storage capacity of 5,000L. The stored water will be used for toilet flushing for all toilets in the entire building. Overflow from the tank(s) will be diverted to the Legal Point of Discharge (LPD) on site.
173 Burke Road Level 3 and Level 4 Terrace (Level 3 terrace shaded in yellow and Level 4 terrace shaded in blue)	771m^2	Runoff from all trafficable terraces in Level 3 to Level 4 of 173 Burke Road development (combined total of 771m^2, Level 4 terrace catchment highlighted in blue, level 3 terrace catchment highlighted in yellow in the markup above) to be connected to a separate rainwater tank with a minimum of 15,000L. This rainwater tank will only be connected to the irrigation system for landscaped irrigation within the development
Permeable Landscaped Area (green area)	32m^2	The landscaped area on the ground floor which is not directly located above basement carpark is assumed to be permeable, with no additional treatment required.
Remaining Impervious Area (unshaded area)	1,634m^2	All remaining impervious area runoff will be diverted directly to the LPD onsite.

Note: There has been no indication of detention requirements on this site. Compliance against the Urban Stormwater Best Practice Environmental Management Guidelines has been achieved via STORM, without detention.

Rainwater Reuse

For the purpose of water consumption calculations within the STORM tool, the occupancy for 173 Burke Road and 28 Hope Street apartments has been estimated based on two occupants for the first bedroom and one occupant for each additional bedroom. Retail tenancies G01 and G02 have been estimated to have 5 and 20 occupants, respectively. Therefore, the total number of occupants estimated for 173 Burke Road building is 198, and the total number of occupants estimated for 28 Hope Street building is 14.

STORM Results

The recommended treatments have been applied to the STORM tool and as a result, the proposed development has achieved score of 102%. With the proposed stormwater treatment measures incorporated into the development, the design will meet the minimum performance standards required by the Stonnington City Council.

Melbourne Water **STORM Rating Report**

TransactionID:	0
Municipality:	STONNINGTON
Rainfall Station:	STONNINGTON
Address:	173 Burke Road & 28 Hope Street
	Glen Iris
	VIC 3146
Assessor:	SDC
Development Type:	Residential - Mixed Use
Allotment Site (m2):	4,752.00
STORM Rating %:	102

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
173 Burke Road Roof Collection Area 1	1,024.00	Rainwater Tank	28,050.00	100	163.90	82.00
173 Burke Road Roof Collection Area 2	1,024.00	Rainwater Tank	28,050.00	100	163.90	82.00
173 Burke Road Roof Collection Area 3	143.00	Rainwater Tank	3,900.00	20	163.80	82.00
28 Hope Street Roof Collection Area	124.00	Rainwater Tank	5,000.00	15	170.00	82.00
Remaining Impervious Area	1,634.00	None	0.00	0	0.00	0.00
Terrace to RWT for Irrigation	771.00	Rainwater Tank	15,000.00	25	128.40	85.90

Figure 12: Stormwater calculator result.

[2] Since the STORM tool only allows a maximum of 100 occupants to be added for each entry row, for the purpose of the Storm assessment, the roof collection area and rainwater tank volume have been split in proportion to the occupancy number assigned in each entry row. The occupancy number of the third row should be 18, but since there is no option to allow "18" to be selected, "20" has been chosen instead.

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 the Owners Corporation 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

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[3]. The diagram below is an illustration of the various objectives which assist in minimising the impacts of stormwater runoff typical during the construction phase. Typical pollutants that are generated from a construction site during a rainfall event include:

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

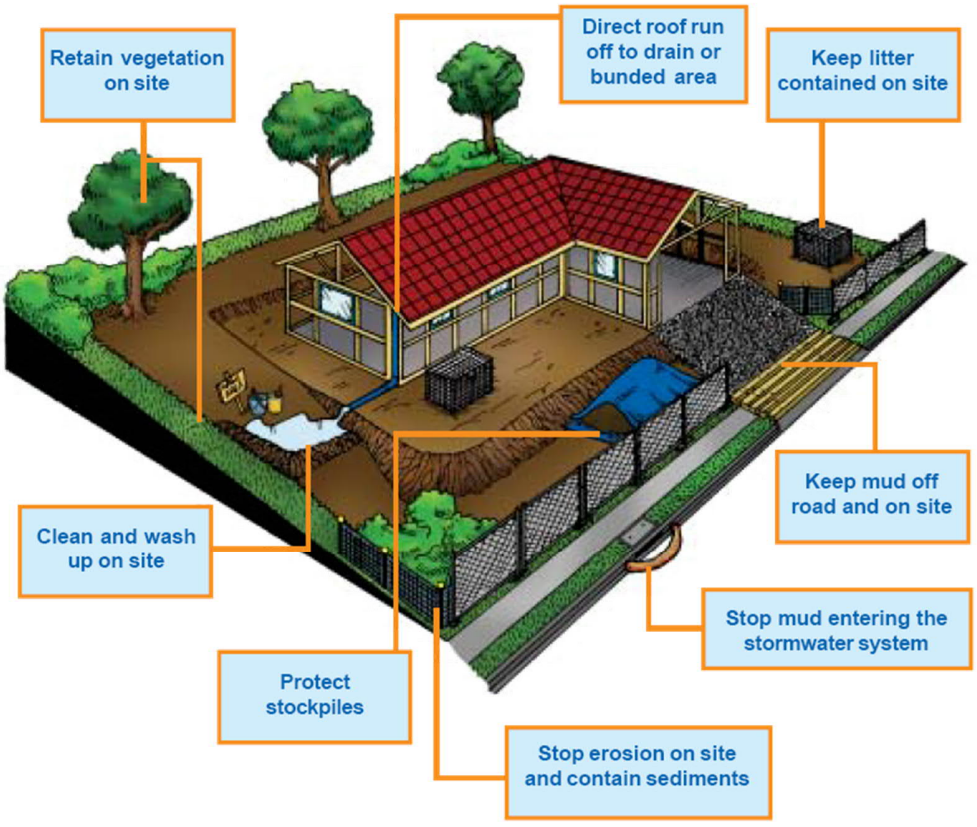
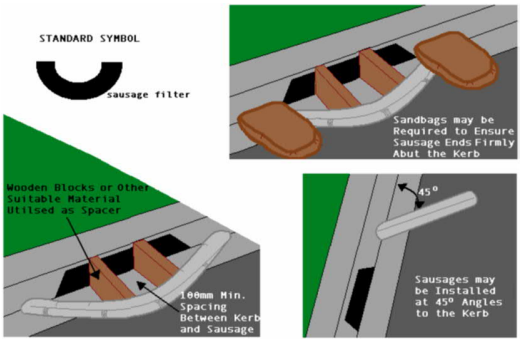


Figure 13: Stormwater will be effectively managed during construction phase according to the requirements listed in "Keeping Our Stormwater Clean – A Builder's Guide"

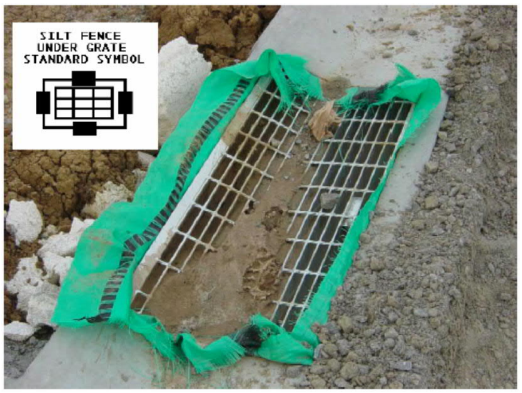
[3] For copies please contact Melbourne Water on 131 722.

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.

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



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



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

Appendix 4 – Green Star VOC and Formaldehyde Limits

Table 3: Maximum Volatile Organic Compound Levels for construction materials (Source: Green Building Council Australia – Green Star Buildings Submission Guidelines Version 1: Revision B, 2021)

Product Type/Subcategory	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 4: Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Buildings Submission Guidelines Version 1: Revision B, 2021)

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

Appendix 5 – FirstRate5 Assessment Results, Assumptions & Recommendations

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

The 173 Burke Road and 28 Hope Street development is located in Climate Zone 62 (Moorabbin Airport) and is required by the Green Star Building NatHERS Energy requirement (against NCC 2022) to achieve a minimum average energy rating of 7.5 Stars with no dwelling less than 6.5 stars when targeting credit achievement for Green Star Building.

The following BCA 2022 heating and cooling load limits will also apply for the development: heating load limit of 82MJ/m^2 and cooling load limit of 25MJ/m^2, with the following heating and cooling load limits apply to each individual dwelling:

- Heating load limit of 91MJ/m^2
- Cooling load limit of 28MJ/m^2

Further, to meet the requirements of Clause 58.03 Table D1 of the Stonnington Planning Scheme, each dwelling must achieve a cooling load of maximum 21MJ/m^2.

Table 5: Thermal groups and justification

Sample Dwelling	Thermally Similar	Justification	Star Rating
173 Burke Road 101	-	Thermally unique	7.2
173 Burke Road 103	Apt 102 and Apt 104	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.4
173 Burke Road 105	Apt 204	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.9
173 Burke Road 111	Apt 110	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.9
173 Burke Road 112	-	Thermally unique	7.6
173 Burke Road 113	Apt 114 and Apt 120	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.5
173 Burke Road 115	-	Thermally unique	6.6
173 Burke Road 116	Apt 119	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.7

Sample Dwelling	Thermally Similar	Justification	Star Rating
173 Burke Road 118	Apt 117	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.7
173 Burke Road 201	-		7.4
173 Burke Road 202	-	Thermally unique	8.9
173 Burke Road 203	-	Thermally unique	8.7
173 Burke Road 205	Apt 106	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.5
173 Burke Road 208	Apt 107, Apt 108, Apt 109, Apt 206, Apt 207	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.5
173 Burke Road 210	Apt 209	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.1
173 Burke Road 211	-	Thermally unique	6.8
173 Burke Road 212	-	Thermally unique	7.5
173 Burke Road 213	-	Thermally unique	6.9
173 Burke Road 214	Apt 217	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.9
173 Burke Road 215	Apt 216	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.8
173 Burke Road 301	-	Thermally unique	8.1
173 Burke Road 302	-	Thermally unique	8.1
173 Burke Road 303	Apt 304 and Apt 305	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.0
173 Burke Road 306	-	Thermally unique	6.9
173 Burke Road 307	-	Thermally unique	6.8
173 Burke Road 401	-	Thermally unique	7.4

Sample Dwelling	Thermally Similar	Justification	Star Rating
173 Burke Road 402	-	Thermally unique	7.4
173 Burke Road 404	Apt 403	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.6
173 Burke Road 405	-	Thermally unique	6.6
173 Burke Road 406	-	Thermally unique	6.5
173 Burke Road 409	Apt 309, Apt 310 and Apt 408	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	8.0
173 Burke Road 410	Apt 308, Apt 311 and Apt 407	Same orientation, similar layout and majority with similar exposed sides. Similar shading.	7.3
28 Hope Street Apartment 1	-	Thermally unique	6.9
28 Hope Street Apartment 2	-	Thermally unique	7.1
28 Hope Street Apartment 3	-	Thermally unique	6.7
28 Hope Street Apartment 4	-	Thermally unique	7.2
28 Hope Street Apartment 5	-	Thermally unique	6.9
28 Hope Street Apartment 6	-	Thermally unique	7.5
Weighted Average	-	-	**7.6**

Table 6: The following are the scores achieved by the dwellings.

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Area (m²)
173 Burke Road 101	7.2	78.6	63.1	15.5	109.1
173 Burke Road 103	8.4	49.6	46	3.6	111.8

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Area (m²)
173 Burke Road 105	7.9	61.2	47.6	13.6	133.7
173 Burke Road 111	7.9	61.3	55.1	6.2	80.0
173 Burke Road 112	7.6	70.0	53.4	16.6	133.2
173 Burke Road 113	7.5	70.7	61.3	9.4	45.0
173 Burke Road 115	6.6	96.7	75.9	20.8	118.0
173 Burke Road 116	7.7	67.9	58.9	9.0	128.3
173 Burke Road 118	8.7	41.1	35.8	5.3	110.0
173 Burke Road 201	7.4	73.2	53	20.2	174.3
173 Burke Road 202	8.9	35.4	30.6	4.8	126.4
173 Burke Road 203	8.7	42.9	38.4	4.5	93.0
173 Burke Road 205	8.5	46.0	42.9	3.1	134.3
173 Burke Road 208	7.5	71.9	64.1	7.8	84.0
173 Burke Road 210	8.1	56.9	44.1	12.8	69.3
173 Burke Road 211	6.8	89.6	74.8	14.8	81.9
173 Burke Road 212	7.5	70.8	64.7	6.1	76.0
173 Burke Road 213	6.9	87.5	74.3	13.2	103.2
173 Burke Road 214	7.9	62.7	54	8.7	118.8
173 Burke Road	8.8	38.8	34.3	4.5	104.7

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Area (m²)
215					
173 Burke Road 301	8.1	56.0	47.2	7.8	198.6
173 Burke Road 302	8.1	55.9	40.8	15.1	178.5
173 Burke Road 303	8.0	58.4	54.3	4.1	98.6
173 Burke Road 306	6.9	87.5	74.5	13.0	182.1
173 Burke Road 307	6.8	91.1	75.9	15.2	176.5
173 Burke Road 401	7.4	73.0.	57.5	15.5	160.4
173 Burke Road 402	7.4	74.1	56.9	17.2	202.4
173 Burke Road 404	7.6	69.8	61.6	8.2	82.5
173 Burke Road 405	6.6	97.3	84.8	12.5	167.6
173 Burke Road 406	6.5	98.7	79.8	18.9	98.7
173 Burke Road 409	8.0	58.8	52.7	6.1	112.0
173 Burke Road 410	7.3	77.0	64.7	12.3	112.0
28 Hope Street Apartment 1	6.9	85.8	74.2	11.6	40.0
28 Hope Street Apartment 2	7.1	81.8	68.0	13.8	63.4
28 Hope Street Apartment 3	6.7	93.0	80.9	12.1	44.5
28 Hope Street Apartment 4	7.2	79.3	60.1	19.2	64.8
28 Hope Street Apartment 5	6.9	86.3	70.7	15.6	47.1

Sample Dwelling	Star Rating	Energy Usage (MJ/m²)	Heating Energy (MJ/m²)	Cooling Energy (MJ/m²)	Net Conditioned Area (m²)
28 Hope Street Apartment 6	7.5	71.2	54.1	17.1	47.3
Average	**7.6**	**68.3**	**57.5**	**10.8**	-

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

Building Fabric Element	Description
External Walls	All external walls are modelled as a mix of Precast Brick and Metal Cladding with R2.7 insulation added and R0.2 thermal break material applied to walls with steel stud. Insulation material with minimum 20% recycled material content will be selected. The external wall colours are modelled as per the External Finishes document. • Brick Type Bk-01 (SA=0.50) • Solid Aluminium Panel AL-01(SA=0.79)
Party Walls	Party walls between dwellings are modelled as double stud with R4.0 insulation added. (R2.0 to both sides). Walls between dwellings and corridors modelled as plasterboard wall with R2.0 thermal insulation added. Walls between dwellings and staircase/lift well have been modelled as concrete wall with R2.0 thermal insulation added. R0.2 thermal break material have been modelled to all steel stud walls.
Internal Walls (28 Hope Street)	28 Hope Street Apartments: Internal walls separating the bathroom and other internal spaces required R2.0 insulation to be added to the stud. R0.2 thermal break material have been modelled to all steel stud walls.
Internal Walls (173 Burke Road)	173 Burke Road Apartments: All internal walls require no added insulation.
Floors	Ground Floor of 28 Hope Street have been modelled as concrete slab on ground with R2.3 underslab insulation added. All 173 Burke Road and 28 Hope Street apartment floors are assumed to be 150mm suspended slab. Where floors are above ground level escalator, entry area or extended beyond the footprint of

<table>
<tr><th>Building Fabric Element</th><th>Description</th></tr>
<tr><td></td><td>the floor below, R3.65 added thermal insulation is required.

All the remaining floors have been modelled with no thermal insulation added.</td></tr>
<tr><td>Floor Coverings</td><td>Floor coverings are modelled timber to kitchen/living/halls, tiles to bathrooms and laundries and carpet to bedrooms and walk-in-robe.</td></tr>
<tr><td>Roof Insulation</td><td>All the roofs in 173 Burke Road and 28 Hope Street Buildings have been modelled as 150mm thick slab roof.

Ceilings with roof or roof terrace above will be required to be insulated with a minimum R6.0 added thermal ceiling insulation to achieve compliance.

Roof colour of the 173 Burke Road building have been modelled with a solar absorptance of 0.79, which represents dark grey colour.

Roof colour of the Hope Street building have been modelled with a solar absorptance of 0.33 which represents Surfmist colour.</td></tr>
<tr><td>Windows and Glazing</td><td>Windows / glazed doors are required to achieve the following glass-and-frame combined thermal performance values:
<table>
<tr><th>Glazing Type</th><th>U-Value</th><th>SHGC</th><th>VLT</th></tr>
<tr><td>Fixed Window</td><td>2.5</td><td>0.24</td><td>0.55</td></tr>
<tr><td>Hinged Door</td><td>3.1</td><td>0.20</td><td>0.43</td></tr>
<tr><td>Sliding Door</td><td>2.9</td><td>0.22</td><td>0.49</td></tr>
<tr><td>Double Hung Window</td><td>3.8</td><td>0.23</td><td>0.48</td></tr>
</table>
Fenestration systems that can achieve these values can be found in low-E Clear double-glazed glass in Capral aluminium frame.

Other glazing system is considered in compliance only where the supplied ‘Total System’ performances (Glass & Frame) meet each of the following criteria:
• Less than or equal to the U-Value specified, and
• Within +/-5% of the SHGC value specified.</td></tr>
<tr><td>Building Sealing</td><td>All doors, windows, exhaust fans and openings will be sealed so to not allow for air infiltration in the apartment.

Exhaust fans have been assumed in all kitchens, bathrooms & ensuites.</td></tr>
<tr><td>Downlights</td><td>Downlights must be ‘IC’ rated (Insulation Contact) to allow for insulation to be placed over the top and be sealed units to prevent air-leakage. Otherwise, downlight covers must be installed to allow for insulation to be placed over the top and no air leakage between habitable room and ceiling.</td></tr>
</table>

Note: The above building elements may vary as the plans are refined for building approval, however the energy

rating performance for each apartment will not be less than 6.5 Stars and the average energy rating for the proposed development will not be less than 7.5 Stars.

Appendix 6 – Preliminary Section J Assessment

This section J energy modelling report relates to the proposed development at 173 Burke Road, Glen Iris and outlines what is required to comply with the 2022 National Construction Code (NCC) energy efficiency requirements.

This Notice is issued in relation to NCC Performance Requirement J1P1 and is prepared in accordance with J1V2, Verification using a reference building, where a building solution is proposed as an alternative solution to the Deemed-to-Satisfy Provisions. This notice is only relevant to NCC Section J, parts J1 (Energy Efficiency Performance Requirement), J4 (Building Fabric) and J5 (Building Sealing).

The proposed development underwent a preliminary energy modelling assessment using DesignBuilder – both as a deemed-to-satisfy designed building and as currently proposed on plans and specifications (available to this point). It has been found that at present the proposed design can meet the requirements of J1V2 of the 2022 NCC.

Below is an image of the DesignBuilder energy model in isometric view of the proposed development.

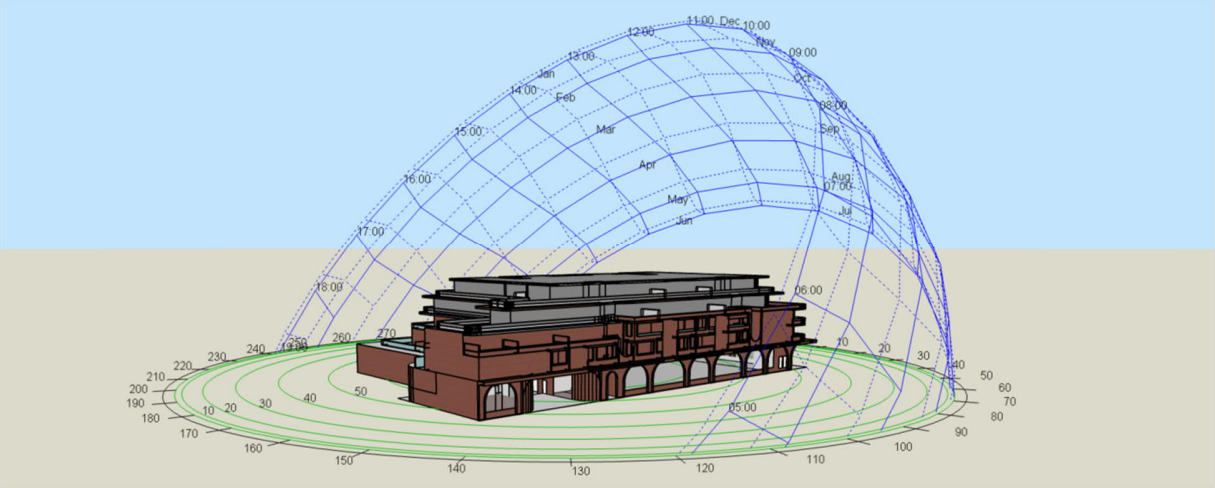


Figure 14: Isometric view of the DesignBuilder energy model for the Section J Assessment.

Modelling Parameters

Building Element	Comments
Walls	External / internal walls that form part of the thermal envelope have been modelled as follows. • **Brick Veneer Wall** Solar absorptance: 0.65 (RN-01 Grey) Construction Details and Insulation Requirement: – 110mm brick. – 30mm airgap. – 90mm R2.5 added insulation installed between studs. – 13mm plasterboard lining. • **Precast Concrete Wall** Construction Details and Insulation Requirement: – 150mm precast concrete panel. – 90mm R2.5 added insulation installed between studs.

<table>
<tr><th>Building Element</th><th>Comments</th></tr>
<tr><td></td><td>
13mm plasterboard lining.
The solar absorptance has been modelled with an added 0.05 to the above values for each external finish, to represent dirt and debris, as per Energy Use Calculation Guide.

Walls outside of the thermal envelope have been modelled as either plasterboard or concrete walls as best derived from the plans.

Please refer to the markups below for the wall insulation requirements.

Note: All wall insulation is required to run up to the roof/ceiling insulation to form an unbroken thermal barrier.
</td></tr>
<tr><td>Floors</td><td>
Ground Floor floors have been modelled as suspended concrete slab above the Basement levels. Sections of floor that form part of the buildings thermal envelope require added insulation to achieve a total system R-value of R2.0.

Floor finishing has been modelled based on the architectural plans provided.

Please refer to the markups below for the floor insulation requirements.
</td></tr>
<tr><td>Roof & Ceiling</td><td>
All roofs have been modelled as suspended concrete slab with plasterboard ceiling/ceiling tiles and a solar absorptance of 0.50 (deemed to satisfied values 0.45 + 0.05). Sections of roof that form part of the buildings envelope require added insulation to achieve a total system R-value of R3.2.

The solar absorptance has been modelled with an added 0.05 to the above values for each external finish, to represent dirt and debris, as per Energy Use Calculation Guide.

Please refer to the markups below for the roof & ceiling insulation requirements.
</td></tr>
<tr><td>Shading</td><td>External overhangs / shading features that provided shading to the building have been modelled as per proposed design. No changes are proposed.</td></tr>
<tr><td>Windows and Glazed Doors</td><td>
External windows / glazed doors that form part of the thermal envelope have been modelled to have the following thermal performance values for glass and frame combined:
<table>
<tr><th></th><th>U-value</th><th>SHGC</th><th>VLT</th></tr>
<tr><td>Fixed Windows</td><td>3.0</td><td>0.50</td><td>0.53</td></tr>
<tr><td>Sliding Doors</td><td>3.4</td><td>0.44</td><td>0.46</td></tr>
<tr><td>Hinged Doors</td><td>3.8</td><td>0.41</td><td>0.40</td></tr>
</table>
The values from the table above are based on the clear Low E double glazing in Capral aluminium frames.

Note: External glazing outside of the thermal envelope (i.e. to the travellators) has also been modelled as clear Low E double glazing for aesthetic consistency around the development.
</td></tr>
<tr><td colspan="2">Please note the above insulation and glazing systems are the minimum requirements to meet the energy efficiency requirement of Section J of the NCC. Please check with the insulation supplier and glazing contractor for other suitable products that may meet the above energy efficiency requirements along with any specific considerations to other project requirements such as structural adequacy, safety, wind loads, acoustics etc.</td></tr>
</table>

Building Element	Comments
Sealing	Any installed roof light when serving a conditioned space or a habitable room must be sealed or capable of being sealed and be constructed as per Provision J5D4. A seal to restrict air infiltration must be fitted to each edge of a door and operable window in accordance with Provision J5D5, other than glazed elements which comply with AS 2047. All entry doors leading to conditioned spaces (with more than 50m^2) must be fitted with a self-closing device. Exhaust fans serving any conditioned spaces must be fitted with self-closing dampers. Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like will be constructed to minimise air leakage via the enclosure by internal lining systems or sealed by caulking, skirting, architraves, cornices or the like as per Provision J5D7.
Thermal Construction & Insulation	Part J4D3 for general thermal construction & installation must be followed, which requires insulation must be installed to comply with AS/NZS 4859.1 and be installed so that it forms a continuous barrier and installed with the required air space. Also, insulation must maintain its position and thickness.

<table>
<tr><th>Building Element</th><th>Comments</th></tr>
<tr><td>Artificial Lighting</td><td>Proposed building lighting power densities have been modelled as 15% less than the referenced maximum illumination power density (W/m²) values listed in NCC 2022 Table J7D3a for each specified space type.

Internal Lighting Power Density:

<table>
<tr><th>Space</th><th>Reference Model (W/m²)</th><th>Proposed Model (W/m²)</th></tr>
<tr><td>Retail Entry & Residential Lobby</td><td>9.00</td><td>7.65</td></tr>
<tr><td>Retail & F&B Tenancies</td><td>14.00</td><td>11.90</td></tr>
<tr><td>BOH Spaces</td><td>5.00</td><td>4.25</td></tr>
<tr><td>Corridors</td><td>5.00</td><td>4.25</td></tr>
<tr><td>Stairs</td><td>2.00</td><td>1.70</td></tr>
<tr><td>Lift cars</td><td>3.00</td><td>2.55</td></tr>
<tr><td>Service Areas</td><td>1.50</td><td>1.28</td></tr>
<tr><td>Carpark</td><td>2.00</td><td>1.70</td></tr>
</table>

External lighting power densities in the reference and proposed model have been calculated and modelled as per the Energy Use Calculation Guide based on the usage category.

External Lighting Power Density Used for Referenced and Proposed Building:

<table>
<tr><th>Space</th><th colspan="2">Usage Category (W/m²)</th><th>Area (m²)</th><th>Reference Building (W)</th></tr>
<tr><td>Entrances & Vehicle Ramps</td><td>P11A</td><td>1.5</td><td>378.9</td><td>568.4</td></tr>
</table>
</td></tr>
<tr><td>Energy Metering and Monitoring</td><td>Access must be provided to all plant, equipment and components of services that require maintenance.

The building must have energy meters configured to record individual time-of-use consumption of electricity, including the energy consumption of the air-conditioning plant, artificial lighting, appliance power for each space type and hot water supply, and other ancillary plant uses. Energy meters are required to be provided is listed below:

• Overall incoming power to the site (assuming gate meter cannot be connected to EMS);
• Individual utility meters for all tenancies;
• Lighting to circulation areas;
• External lighting;
• Power for lifts;
• Mechanical board;
• Swimming pool heating; and
• Solar PV (Generation).

These energy meters must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface</td></tr>
</table>

Building Element	Comments
	monitoring system where it can be stored, analysed and reviewed.
Facilities for Electric Vehicle Charging Equipment	The requirements of NCC 2022 Clause J9D4 are to be discussed and confirmed in relation to the project, with the relevant building surveyor and electrical engineer.
Heating, Ventilation & Air-Conditioning (HVAC)	The systems were zoned as outlined in Appendix 1 below. Unitary heat pump air conditioning systems have been modelled to the proposed F&B tenancy and Residential Lobby and a VRV system to the Woolworth retail tenancy. These must have an EER/COP 10% more efficient than the minimum allowed under MEPS for an equivalent sized unit. The proposed mechanical system has been modelled with 100% improvement of outdoor air over AS1668.2:2012 for the default occupancy. All ventilation systems must be selected to meet DTS requirements of Part J6 of the 2022 NCC. If alternative HVAC zoning or equipment type is proposed, please notify SDC of the proposed system types and zoning so that we can update the energy model and confirm that the building fabric advice provided is still relevant.
Occupancy and Operation Schedules	Occupancy densities have been modelled as 4.5m^2/person for the Retail tenancy and 5m^2/person for the F&B tenancy as an estimation based off other Woolworth Project occupancy numbers. The modelled operating schedule of each space has been adjusted to 7am-10pm operation based on the Energy Use Calculation Guide Default Operating Schedules.
Solar PV	The project has been modelled to include a 100kW Solar PV array.
Facilities for Solar Photovoltaic and Battery Systems	The requirements of NCC 2022 Clause J9D5 are to be discussed and confirmed in relation to the project, with the relevant building surveyor and electrical engineer.

To achieve compliance with NCC Section J1V2, the annual greenhouse gas emissions of the proposed building should be less than 90% of the annual greenhouse gas emissions of the reference building. Additionally, to meet the mandatory credit achievement requirements (for projects pursuing Green Star Building 5 stars), the proposed building energy use (with solar contribution factored in) need to be at least 20% less than the referenced building.

Also, in the proposed building, a thermal comfort level of between a Predicted Mean Vote (PMV) of -1 to +1 is required across 95% of the floor area of all occupied zones for not less than 98% of the annual hours of operation of the building. The thermal comfort results can be found in the results section following.

HVAC Zone Layout

Coloured area mark-ups indicate the proposed HVAC zones. Areas not highlighted indicate assumed non-conditioned spaces.

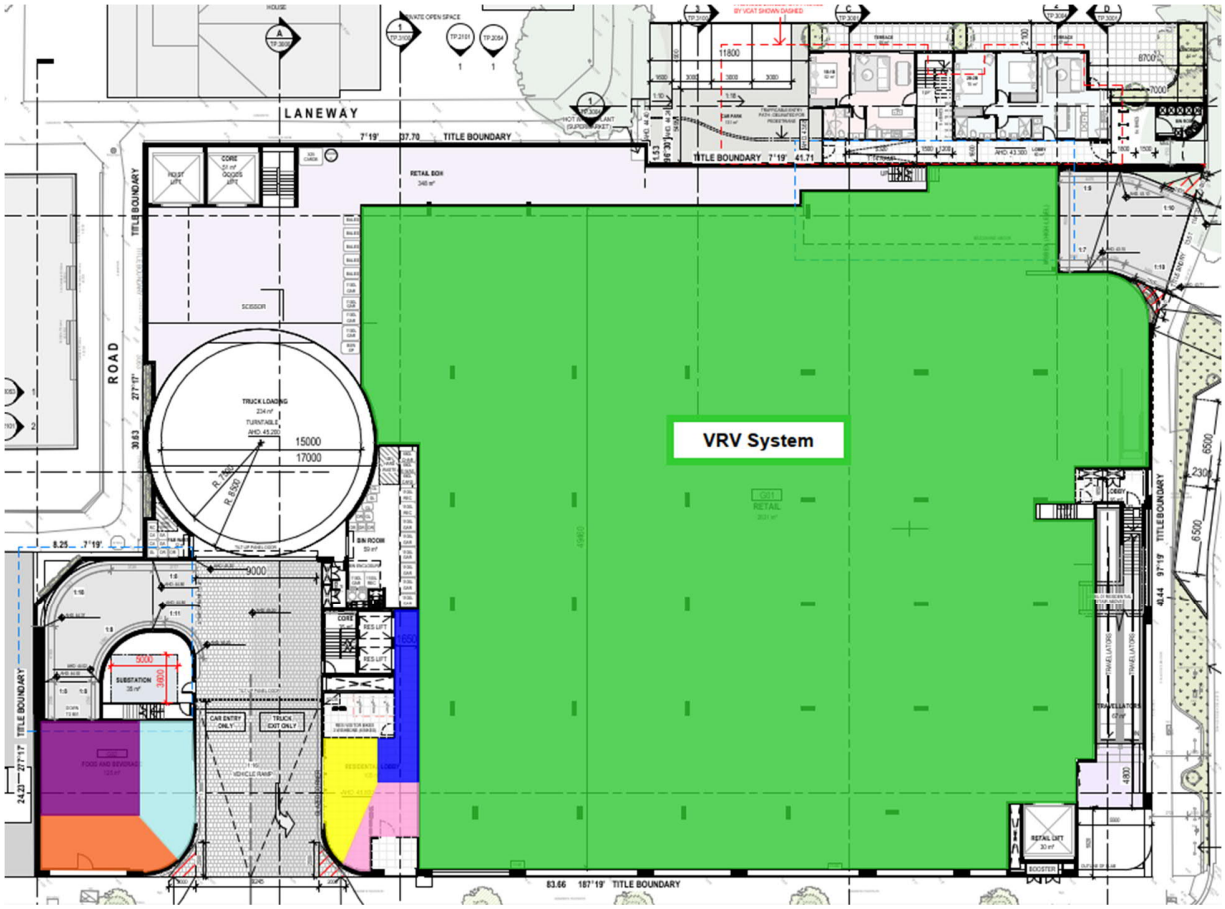


Figure 15: HVAC Zoning

Insulation Requirement Mark-ups

Building fabrics that form part of the wall building envelope are required to be insulated as per the following markups.

The envelope walls are required to be insulated per the markup drawings below. Please note some perimeter lines are drawn on the floor plans where windows are located. These coloured lines represent the insulated brick and precast concrete walls which sit above/below glazing.

Note: The wall insulation requirements correspond to the Ground Level only and not the Break Tank/Fire Pump Mezzanine above the retail tenancy.

Envelope Wall	Colour Key
Brick Veneer Walls which have been modelled with added R2.5 insulation installed between studs.	
Precast Concrete Walls which have been modelled with added R2.5 insulation installed between studs.	

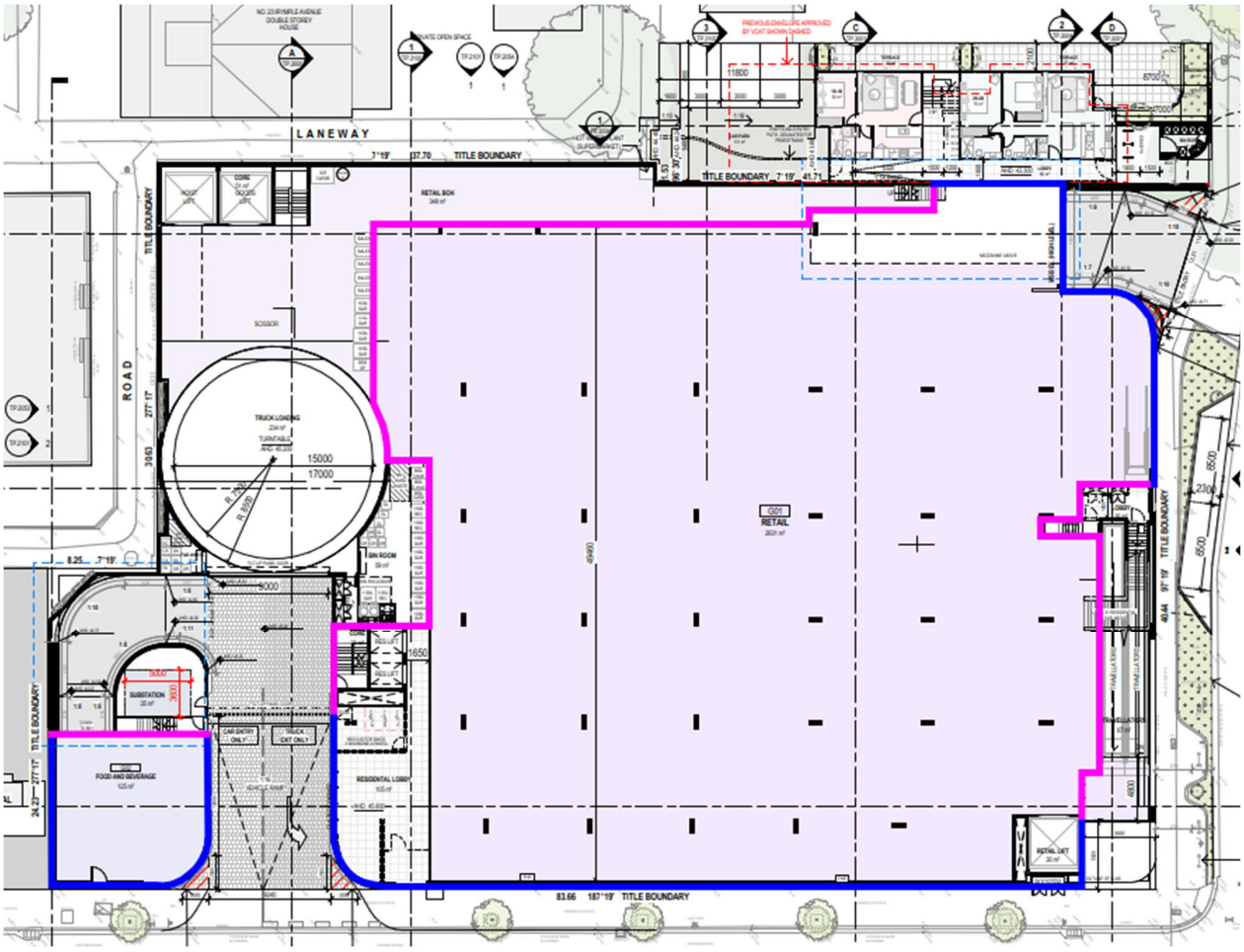


Figure 16: Proposed insulated walls for the Ground Level.

The envelope roof sections are required to be insulated per the markup drawings below.

Note: The roof insulation requirements correspond to the Ground Level only and not the Break Tank/Fire Pump Mezzanine above the retail tenancy.

Envelope Roof	Colour Key
Requires total system R-value R3.2.	

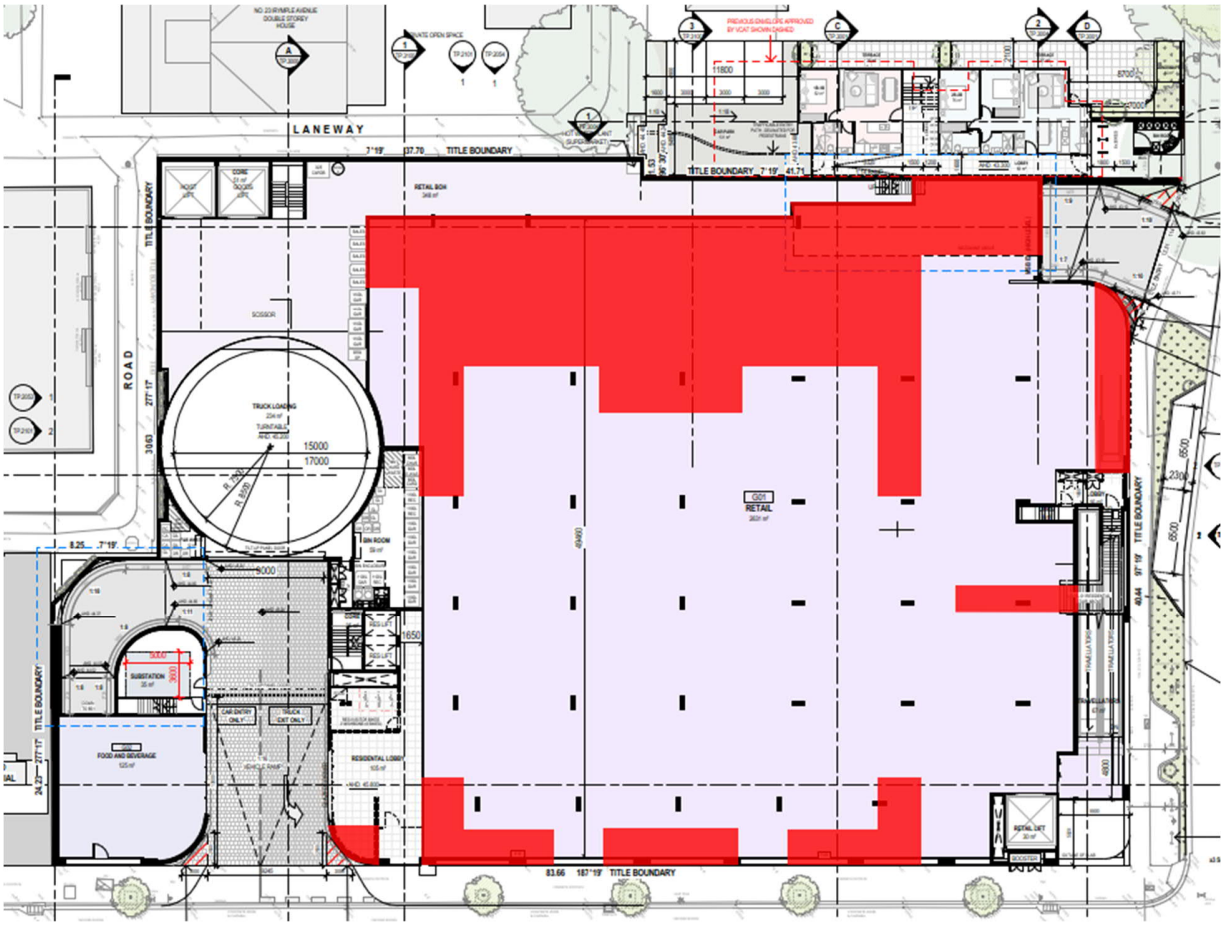


Figure 17: Proposed insulated roof sections for the Ground Level.

The envelope floor sections are required to be insulated per the markup drawings below.

Note: The floor insulation requirements correspond to the Ground Level only and not the Break Tank/Fire Pump Mezzanine above the retail tenancy.

Envelope Floor	Colour Key
Requires total system R-value R2.0.	

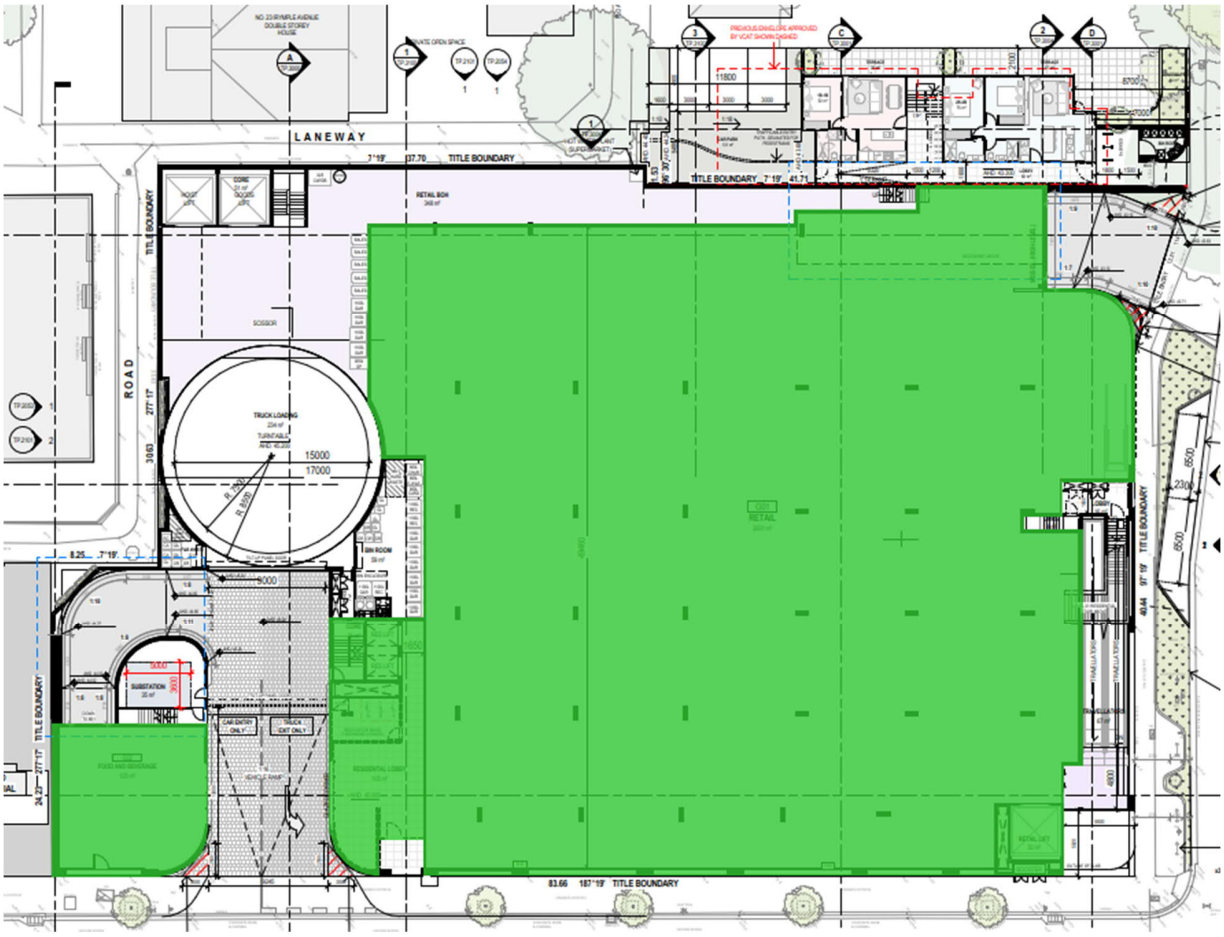


Figure 18: Proposed insulated floor sections for the Ground Level.

Wall Insulation Calculations

The individual thermal requirements of wall sections are calculated from the BCA Façade Calculator.

If alternative wall specifications are proposed, please notify SDC of the proposed specification types and layers so that we can update the wall insulation calculations and confirm that the building fabric advice provided is still relevant.

Wall Type	Insulation Requirement
Brick Veneer Wall	110mm Brick + 30mm Airspace + 90mm Steel Stud, 0.75BMT Web, 35mm Flange and 90mm R2.5 insulation batt + 13mm Plasterboard
Precast Concrete Panel Wall	150mm Precast Concrete + 90mm Steel Stud, 0.75BMT Web, 35mm Flange and 90mm R2.5 insulation batt + 13mm Plasterboard

NOTES:

1. *All walls that are part of the thermal envelope must run to the roof frame and the wall insulation must form a continuous barrier with the roof blanket.*
2. *The Wall Structure and Insulation types specified for the development must, as a minimum, meet the thermal performance values detailed here for this design advice to hold true.*

The following calculations were input for walls forming the thermal envelope in the BCA Façade Calculator:

- **Brick Veneer Wall (External)**

Wall Systems

Ventilation		Unventilated					
Material	Clay brick - 3.25kg	Airspace - non-reflective unventilated	Insulation 90mm R2.5	Gypsum plasterboard			
Thickness (mm)	110	30	90	13			
Conductivity (W/mK)	0.650		0.036	0.170			
Framing Material			Steel				
Metal Frame, Web Thickness (mm)			0.75				
Metal Frame, Flange Width (mm)			35				
Framing Area %			13.0%				
Thermal Break Material							
Thermal Break Thickness (mm)							
Thermal Break Overlap Area %							
Resistance (m².K/W)	0.17	0.00	1.21	0.08	0	0	0
Wall Construction	Brick Veneer 3.25kg		External Surface Resistance (moving air, more than 3m/s and not more than 7/ms wind speed)				0.03
						Internal Surface Resistance (still air, on a wall)	0.12
						System R-Value (m².K/W)	1.60
						System U-Value (W/m².K)	0.62

- **Precast Concrete Wall (Internal)**

Wall Systems							
	Layer 1	Layer 2 (Air space)	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7
Ventilation		Unventilated					
Material	Concrete - solid	Insulation 90mm R2.5	Gypsum plasterboard				
Thickness (mm)	150	90	13				
Conductivity (W/mK)	1.440	0.036	0.170				
Framing Material		Steel					
Metal Frame, Web Thickness (mm)		0.75					
Metal Frame, Flange Width (mm)		35					
Framing Area %		13.0%					
Thermal Break Material							
Thermal Break Thickness (mm)							
Thermal Break Overlap Area %							
Resistance (m².K/W)	0.10	0.55	0.08	0	0	0	0
Wall Construction	Concrete 150mm (Int/Semi-Expo)					Internal Surface Resistance (Still air)	0.14
						Internal Surface Resistance (still air, on a wall)	0.12
						System R-Value (m².K/W)	0.99
						System U-Value (W/m².K)	1.01

BCA Deemed-to-Satisfy Façade Calculator

The results of the Façade calculator completed for the reference building is provided below. Please note that these requirements were included in the reference building only and are not the required values needing to be met in the proposed building. This has been provided for comparison purposes only.

ABCB

Façade

Report

National Construction Code Calculator

Project Summary

Date
2023-12-08

Name
Sierra Ward

Company
SDC

Position
ESD Consultant

Building Name / Address
173 Burke Road
Glen Iris

Building State
VIC

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification
Mixed 2 - 2 common, 5, 6, 7, 8, 9b, 9a non-ward

Storeys Above Ground
1

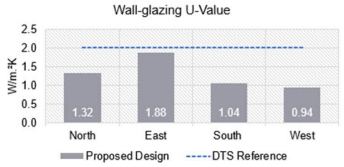
Tool Version
1.2 (June 2020)

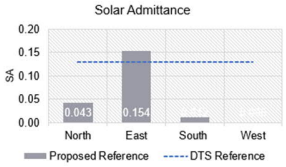
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

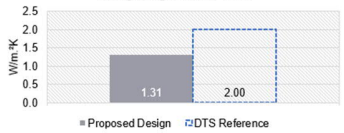
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.32	1.88	1.04	0.94	1.31
Solar Admittance	0.04	0.15	0.01		
AC Energy Value					152

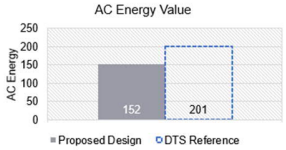
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	91.705	236.02	25.705	0
Glazing to Façade Ratio	25%	50%	7%	0%
Glazing References	Fixed 1 Fixed 2 Sliding 1	Fixed 1 Fixed 2 Hinged 1 Hinged 2 Fixed 4 Fixed 3	Fixed 1	
Glazing System Types	Fixed Sliding Door	Fixed Casement	Fixed	
Glass Types	Double Glazed Unit - single low-E coating	Double Glazed Unit - single low-E coating	Double Glazed Unit - single low-E coating	
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)	3.07	3.03	3.00	
Average Glazing SHGC	0.49	0.50	0.50	0.00

Shading Systems	Device Horizontal	Device Horizontal	Device Horizontal	Device Horizontal
Wall Area (m²)	275.145	237.55	338.375	482.27
Wall Types	Wall	Wall	Wall	Wall
Methodology	Wall			
Wall Construction	External Internal	External Internal	External Internal	External Internal
Wall Thickness	250 150	250 150	250 150	250
Average Wall R-value (m².K/W)	1.35	1.35	1.12	1.07
Solar Absorptance	0.67 0.6	0.67 0.6	0.67 0.6	0.67 0.6

Reference Building

Include shading? As Proposed

	Glazing to Façade Ratio	Method 1 Wall U-Value (W/m².K)	Method 1 Glazing U-Value (W/m².K)	Method 1 Shading Multiplier	Method 1 SHGC	Method 2 Wall U-Value (W/m².K)	Method 2 Glazing U-Value (W/m².K)	Method 2 SHGC
North	25%	0.74	5.78	0.350	0.81	0.72	5.06	0.66
East	50%	0.74	3.27	0.623	0.42			
South	7%	0.71	5.80	0.350	0.81			
West	0%	0.71						

Energy Modelling Results

Simulated End Uses (kWh)	Reference Building with DTS Services	Proposed Building with DTS Services	Proposed Building with Proposed Services (exclude solar PV)	Proposed Building with Proposed Services (include solar PV)
Heating	6,614	6,007	56,220	56,220
Cooling	105,648	105,481	56,828	56,828
HVAC Fans & Pumps	35,020	33,934	32,836	32,836
Interior Lighting	447,026	447,026	379,972	379,972
Exterior Lighting	1,754	1,754	1,754	1,754
Lift	22,090	22,090	22,090	22,090
DHW	25,398	25,398	16,864	16,864
Rainwater Pumps	-	-	7,326	7,326
Solar PV Generation (total of 100kW)	-	-	-	-117,048
Total End Uses	643,549	641,689	573,890	456,842
Total Greenhouse Gas Emissions ($KgCo^2$/year)	752,952	750,776	671,452	534,505
Improvement – % of Reference Building		2.89%	10.82%	29.01%

Thermal Comfort

The following table summarises the percentage of hours that the development's occupants PMV is between -1 and +1 inclusive for occupied spaces.

Thermal Comfort Zones	Annual Occupied Hours	Total No. Hours within PMV (Proposed)	Total Percentage of hours within PMV (Proposed)
F&B Tenancy North	5,040	5,040	100%
F&B Tenancy East	5,040	5,040	100%
F&B Tenancy Internal	5,040	5,040	100%
Retail (Supermarket) Tenancy	5,040	5,040	100%

Conclusion

The development meets the required target of 95% of the nominated area, for 98% of the year. The total annual energy use of the proposed design is 11% less than the annual energy use of the Reference Building (when solar PV is excluded from the calculation) and when 100kW solar PV system is included, the overall energy improvement achieved 29%. This means the credit achievement requirement for 5 Star Green Star Building has been met.

Appendix 7 – Daylight Assessment

Windows have been included to provide daylight and views to the living rooms and bedrooms in all the apartments. This meets the minimum expectation of the daylight category under the Light Quality Credit for the Green Star Building Tool.

Two points (for credit achievement under Light Quality Credit) can be achieved when:

- For non-residential component, daylight level needs to have at least 160 lux due to daylight during 80% of the nominated hours for at least 40% of the regularly occupied areas across the building must receive high levels of daylight with no less than 20% on any floor or tenancy (whichever is smaller).
- For Class 2 components, 60% of the combined living and bedroom area of each unit must have daylight level which meets 160 lux due to daylight during 80% of the nominated hours. Kitchens are not included in the calculations. The daylight levels must also be present in at least 20% of the area of each bedroom and living area.

The daylight assessment, therefore, has been conducted to confirm if the daylight requirement can be achieved for credit achievement under Light Quality Credit.

The daylight assessment was carried out using DesignBuilder with the same inputs as the thermal performance modelling, including the building geometry and orientation, and the following visible reflectance (building fabric) / visible light transmittance (fenestration):

	Visible Reflectance
Concrete External Wall	0.25
Brick External Wall	0.30
Metal Clad External Wall	0.35
Plasterboard Wall Lining	0.80
Plasterboard Ceiling	0.80
Ceiling Tiles	0.70
Floor Tiles	0.20
Vinyl Floor Sheeting	0.20
Bare Concrete Floor	0.25
Carpet	0.10
	Visible Light Transmittance
Fenestration:	
Ground Floor Fixed Windows	0.53
Ground Floor Sliding Doors	0.46
Ground Floor Hinged Doors	0.40
Levels 1-4 Fixed Windows	0.55
Levels 1-4 Fixed Obscured Windows	0.40
Levels 1-4 Awning Windows	0.38
Levels 1-4 Sliding Windows	0.44
Levels 1-4 Double Hung Windows	0.48
Levels 1-4 Hinged Doors	0.43
Levels 1-4 Sliding Doors	0.49

The visible light transmittance values for all external fenestration from the table above are based on EVantage Clear double glazing for the Ground Floor and AGG MAX Clear Double Glazing for Levels 1-4.

The below images display a rendered view of the daylight model for the proposed development. Note that the colour is for display purposes only.

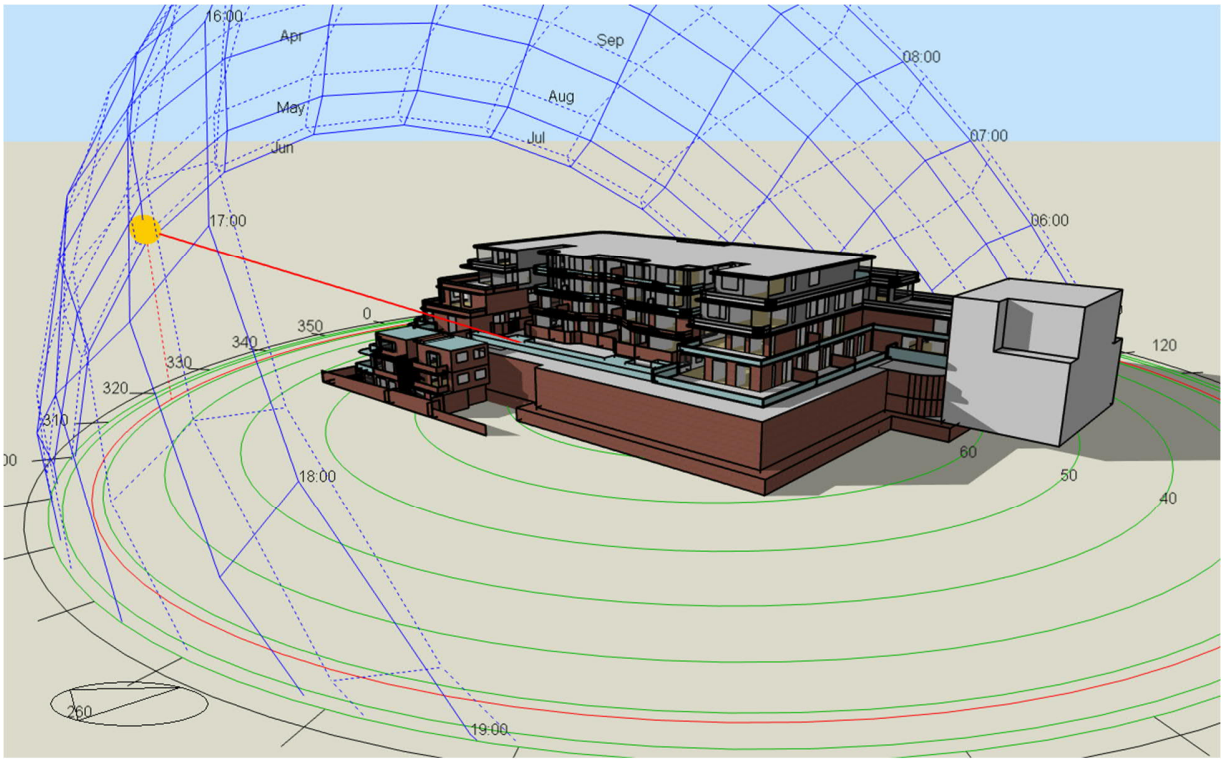


Figure 19: Southwest view of the daylight model for the proposed development, showing the sun-path at 3pm on 15th July as an example.

Daylight Results

The images in this section are the daylight lux maps exported from the modelling program DesignBuilder which were produced by the Radiance simulation engine. Please note that they are graphical representation of the results only, for accurate results please refer to the summaries in Table 7 and Table 8 for details.

Table 7: Detailed Results of Daylight Analysis.

Building/Tenancy	Total Floor Area (m^2)	Floor Area above Threshold (m^2)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
Ground Floor			
Food & Beverage Tenancy	125.4	119.9	96%
Supermarket	2,640.0	880.7	33%
Level 1			
101 Bedroom 1	11.1	11.1	100%
101 Bedroom 2	9.8	9.8	100%
101 Bedroom 3	9.8	9.8	100%
101 Living Area	32.1	30.3	94%

Building/Tenancy	Total Floor Area (m^2)	Floor Area above Threshold (m^2)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
102 Bedroom 1	11.6	11.6	100%
102 Bedroom 2	10.4	10.4	100%
102 Living Area	21.9	21.9	100%
103 Bedroom 1	10.6	10.6	100%
103 Bedroom 2	8.9	8.9	100%
103 Living Area	25.1	24.8	99%
104 Bedroom 1	10.6	10.6	100%
104 Bedroom 2	9.9	9.9	100%
104 Living Area	23.6	16.7	71%
105 Bedroom 1	14.3	14.3	100%
105 Bedroom 2	9.0	9.0	100%
105 Bedroom 3	9.7	9.7	100%
105 Living Area	31.3	31.3	100%
106 Bedroom 1	11.3	7.4	65%
106 Bedroom 2	9.8	9.8	100%
106 Bedroom 3	9.1	3.0	33%
106 Living Area	24.0	16.6	69%
107 Bedroom 1	10.5	10.5	100%
107 Bedroom 2	9.5	8.6	90%
107 Living Area	23.2	22.7	98%
108 Bedroom 1	10.6	10.6	100%
108 Bedroom 2	9.5	4.5	48%
108 Living Area	23.2	19.2	83%
109 Bedroom 1	10.7	10.7	100%
109 Bedroom 2	9.2	9.2	100%
109 Living Area	23.5	21.4	91%
110 Bedroom 1	10.6	10.6	100%
110 Bedroom 2	9.0	2.7	31%
110 Living Area	25.1	17.7	71%
111 Bedroom 1	10.5	10.5	100%
111 Bedroom 2	11.6	11.6	100%
111 Living Area	26.3	15.8	60%

Building/Tenancy	Total Floor Area (m²)	Floor Area above Threshold (m²)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
112 Bedroom 1	12.5	12.5	100%
112 Bedroom 2	10.1	10.1	100%
112 Bedroom 3	10.5	10.5	100%
112 Living Area	34.8	34.8	100%
113 Bedroom	10.9	10.9	100%
113 Living Area	12.8	12.8	100%
114 Bedroom 1	9.7	9.7	100%
114 Bedroom 2	23.7	23.7	100%
114 Living Area	12.9	12.9	100%
115 Bedroom 1	10.9	10.9	100%
115 Bedroom 2	9.0	9.0	100%
115 Bedroom 3	29.2	28.3	97%
115 Living Area	14.4	12.0	83%
116 Bedroom 1	9.2	0.0	0%
116 Bedroom 2	11.7	2.7	23%
116 Bedroom 3	38.1	38.1	100%
116 Living Area	12.3	12.3	100%
117 Bedroom 1	11.2	9.0	80%
117 Bedroom 2	24.8	24.8	100%
117 Living Area	12.8	12.8	100%
118 Bedroom 1	11.2	6.3	56%
118 Bedroom 2	24.8	24.8	100%
118 Living Area	14.3	13.3	93%
119 Bedroom 1	11.6	2.7	23%
119 Bedroom 2	8.8	0.0	0%
119 Bedroom 3	37.3	37.3	100%
119 Living Area	11.9	11.9	100%
120 Living Area	8.8	1.0	11%
120 Bedroom	11.1	11.1	100%
Level 2			
201 Bedroom 1	10.4	10.4	100%
201 Bedroom 2	11.8	11.8	100%

Building/Tenancy	Total Floor Area (m²)	Floor Area above Threshold (m²)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
201 Bedroom 3	9.5	6.8	71%
201 Living Area	56.6	52.3	92%
201 Living Area 2	13.6	13.6	100%
202 Bedroom 1	9.8	9.8	100%
202 Bedroom 2	10.2	10.2	100%
202 Living Area	25.0	23.9	96%
203 Bedroom 1	10.6	10.6	100%
203 Bedroom 2	9.9	9.9	100%
203 Living Area	24.8	24.8	100%
204 Bedroom 1	14.3	14.3	100%
204 Bedroom 2	9.0	9.0	100%
204 Bedroom 3	9.7	9.7	100%
204 Living Area	31.3	31.3	100%
205 Bedroom 1	11.3	11.3	100%
205 Bedroom 2	9.8	9.8	100%
205 Bedroom 3	9.1	4.1	44%
205 Living Area	27.0	23.0	85%
206 Bedroom 1	13.1	13.1	100%
206 Bedroom 2	9.5	3.6	38%
206 Living Area	23.2	22.1	95%
207 Bedroom 1	10.6	10.6	100%
207 Bedroom 2	9.5	8.8	93%
207 Living Area	23.2	22.7	98%
208 Bedroom 1	9.9	9.9	100%
208 Bedroom 2	10.0	10.0	100%
208 Living Area	23.5	22.8	97%
209 Bedroom 1	10.5	10.5	100%
209 Bedroom 2	9.2	9.2	100%
209 Living Area	21.6	21.6	100%
210 Bedroom 1	10.6	10.6	100%
210 Bedroom 2	8.9	8.9	100%
210 Living Area	20.7	20.7	100%

Building/Tenancy	Total Floor Area (m²)	Floor Area above Threshold (m²)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
211 Bedroom 1	10.2	10.2	100%
211 Bedroom 2	9.2	9.2	100%
211 Bedroom 3	9.5	9.5	100%
211 Living Area	17.6	17.6	100%
212 Bedroom 1	11.0	11.0	100%
212 Bedroom 2	9.5	9.5	100%
212 Living Area	22.1	22.1	100%
213 Bedroom 1	11.7	11.7	100%
213 Bedroom 2	9.8	9.8	100%
213 Bedroom 3	9.1	9.1	100%
213 Living Area	28.4	28.4	100%
214 Bedroom 1	13.0	13.0	100%
214 Bedroom 2	8.3	1.9	23%
214 Bedroom 3	9.2	3.1	33%
214 Living Area	34.7	34.7	100%
215 Bedroom 1	12.1	12.1	100%
215 Bedroom 2	11.0	4.4	40%
215 Living Area	26.0	25.5	98%
216 Bedroom 1	12.5	12.5	100%
216 Bedroom 2	11.1	4.4	40%
216 Living Area	26.0	25.5	98%
217 Bedroom 1	12.7	12.7	100%
217 Bedroom 2	9.2	4.4	48%
217 Bedroom 3	8.8	2.9	33%
217 Living Area	34.1	34.1	100%
Level 3			
301 Bedroom 1	11.8	11.8	100%
301 Bedroom 2	10.7	10.7	100%
301 Bedroom 3	11.3	11.3	100%
301 Living Area 1	50.0	50.0	100%
301 Living Area 2	17.5	17.5	100%
302 Bedroom 1	14.5	14.5	100%

Building/Tenancy	Total Floor Area (m²)	Floor Area above Threshold (m²)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
302 Bedroom 2	9.3	9.3	100%
302 Bedroom 3	9.1	9.1	100%
302 Living Area	12.8	12.8	100%
303 Bedroom 1	10.5	6.1	58%
303 Bedroom 2	23.6	21.4	91%
303 Living Area	10.6	5.7	53%
304 Bedroom 1	23.6	23.3	99%
304 Bedroom 2	12.8	12.8	100%
304 Living Area	20.2	20.2	100%
305 Bedroom 1	11.2	11.2	100%
305 Bedroom 2	11.2	11.2	100%
305 Living Area	21.1	21.1	100%
306 Bedroom 1	11.6	11.6	100%
306 Bedroom 2	11.0	11.0	100%
306 Bedroom 3	37.5	37.5	100%
306 Living Area 1	16.4	16.4	100%
306 Living Area 2	14.3	14.3	100%
307 Bedroom 1	9.2	2.5	28%
307 Bedroom 2	9.2	7.4	81%
307 Bedroom 3	26.0	26.0	100%
307 Living Area 1	12.8	12.8	100%
307 Living Area 2	11.0	9.0	82%
308 Bedroom 1	26.0	21.1	81%
308 Bedroom 2	13.2	13.2	100%
308 Bedroom 3	11.1	7.1	64%
308 Living Area	26.0	20.5	79%
309 Bedroom 1	12.9	12.9	100%
309 Bedroom 2	9.1	5.0	56%
309 Living Area	26.4	26.4	100%
310 Bedroom 1	11.8	11.8	100%
310 Bedroom 2	10.7	10.7	100%
310 Living Area	11.3	11.3	100%

Building/Tenancy	Total Floor Area (m²)	Floor Area above Threshold (m²)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
311 Bedroom 1	50.0	50.0	100%
311 Bedroom 2	17.5	17.5	100%
311 Bedroom 3	14.5	14.5	100%
311 Living Area	9.3	9.3	100%
Level 4			
401 Bedroom 1	13.0	13.0	100%
401 Bedroom 2	9.0	9.0	100%
401 Bedroom 3	9.0	9.0	100%
401 Living Area	54.5	54.1	99%
402 Bedroom 1	12.9	12.9	100%
402 Bedroom 2	10.2	10.2	100%
402 Bedroom 3	10.6	10.6	100%
402 Living Area	38.1	38.1	100%
403 Bedroom 1	10.2	10.2	100%
403 Bedroom 2	10.7	9.0	85%
403 Living Area	10.2	10.2	100%
404 Bedroom 1	10.6	9.8	92%
404 Bedroom 2	20.7	20.7	100%
404 Living Area	13.2	13.2	100%
405 Bedroom 1	11.2	11.2	100%
405 Bedroom 2	11.3	11.3	100%
405 Bedroom 3	48.4	48.4	100%
405 Living Area	10.8	10.8	100%
406 Bedroom 1	10.3	10.3	100%
406 Bedroom 2	30.7	30.7	100%
406 Living Area	9.0	5.8	64%
407 Bedroom 1	9.0	9.0	100%
407 Bedroom 2	25.8	25.8	100%
407 Bedroom 3	13.5	13.5	100%
407 Living Area	11.1	9.8	88%
408 Bedroom 1	26.0	24.7	95%
408 Bedroom 2	13.4	13.4	100%

Building/Tenancy	Total Floor Area (m²)	Floor Area above Threshold (m²)	Tenancy Floor Area with ≥ 160 lux during 80% Nominated Hours
408 Living Area	11.1	8.9	80%
409 Bedroom 1	25.9	25.2	97%
409 Bedroom 2	13.0	13.0	100%
409 Living Area	9.1	9.1	100%
410 Bedroom 1	26.8	26.8	100%
410 Bedroom 2	13.0	13.0	100%
410 Bedroom 3	9.0	9.0	100%
410 Living Area	9.0	9.0	100%
28 Hope St Ground Floor			
GF1 Bedroom 1	11.7	11.7	100%
GF1 Bedroom 2	8.7	8.7	100%
GF 1 Living Area	20.3	20.3	100%
GF2 Bedroom 1	11.4	11.4	100%
GF2 Living Area	18.3	18.3	100%
28 Hope St Level 1			
101 Bedroom 1	10.6	10.6	100%
101 Bedroom 2	8.3	8.3	100%
101 Living Area	19.7	19.7	100%
102 Bedroom 1	9.4	9.4	100%
102 Living Area	16.2	16.2	100%
28 Hope St Level 2			
201 Bedroom 1	9.6	9.6	100%
201 Living Area	15.8	15.8	100%
202 Bedroom 1	9.6	9.6	100%
202 Living Area	15.8	15.8	100%

Table 8: Summary of Daylight Analysis Result.

Development	Total Floor Area (m²)	Floor Area above Threshold (m²)	Overall Floor Area above 2 % daylight factor
Retail	2,765.4	1,000.6	36%
Apartments	3,432.8	3,182.5	93%

Analysis:

The summary table above presents the daylight modelling results (based on daylight autonomy) of the applicable spaces, indicating that 36% of the non-residential occupied space and 93% of the residential occupied space in the development will achieve high levels of daylight. However, the proposed design does not meet the daylight requirement for Green Star Building Light Quality credit achievement, as a few of the apartments have less than 20% of the area of each bedroom and living room meeting 160 Lux during 80% of the occupied hours.

Most of the apartments have been provided with large unobstructed windows, allowing ample sunlight to penetrate the apartment space. Despite the design of large windows to the bedrooms, one bedroom in the three-bedroom apartment No.s 116 and 119 still unavoidably fail to meet the daylight requirement as does the living room of apartment 120. The non-compliant daylight results of the bedrooms is due to the significant building geometry obstructions within the site and limited living room glazing in apartment 120 can be attributed to its open suite layout and energy use considerations.

Considering that the living area and master bedrooms in apartments 116, and 119 and bedroom in apartment 120 have been designed with reasonable room depth and sufficiently unobstructed glazing that doesn't deteriorate the energy modelling result, SDC considers that these three residencies have been designed with the aim of allowing as much daylight amenities as possible. Therefore, the overall development design should be considered compliant with the daylight requirement for the town planning application.

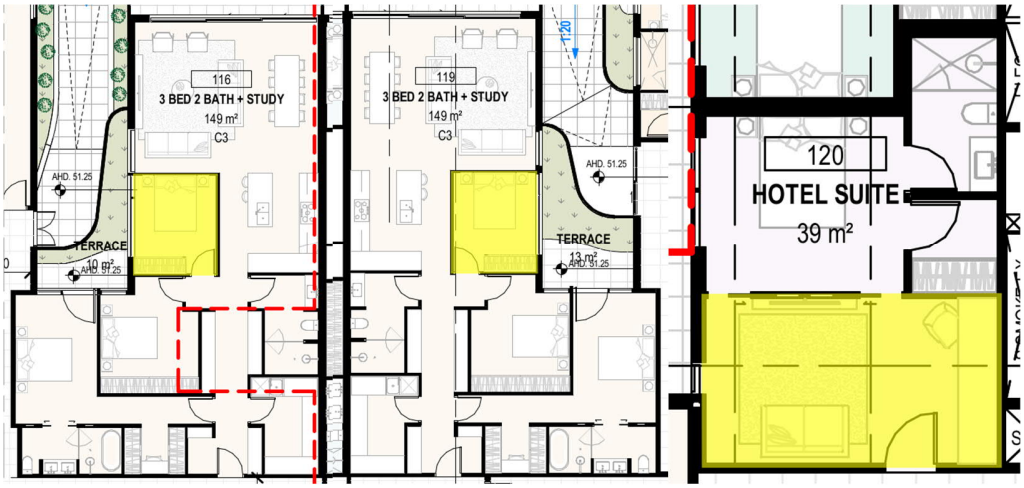


Figure 20: Bedrooms and Living Areas (highlighted in yellow) with <20% floor area with ≥ 160 lux during 80% Nominated Hours

Lux Map Legend

- Grey < 80% annual hours achieving 160 lux (non-compliant area)
- Black to Red > 80% annual hours achieving 160 lux (compliant area)

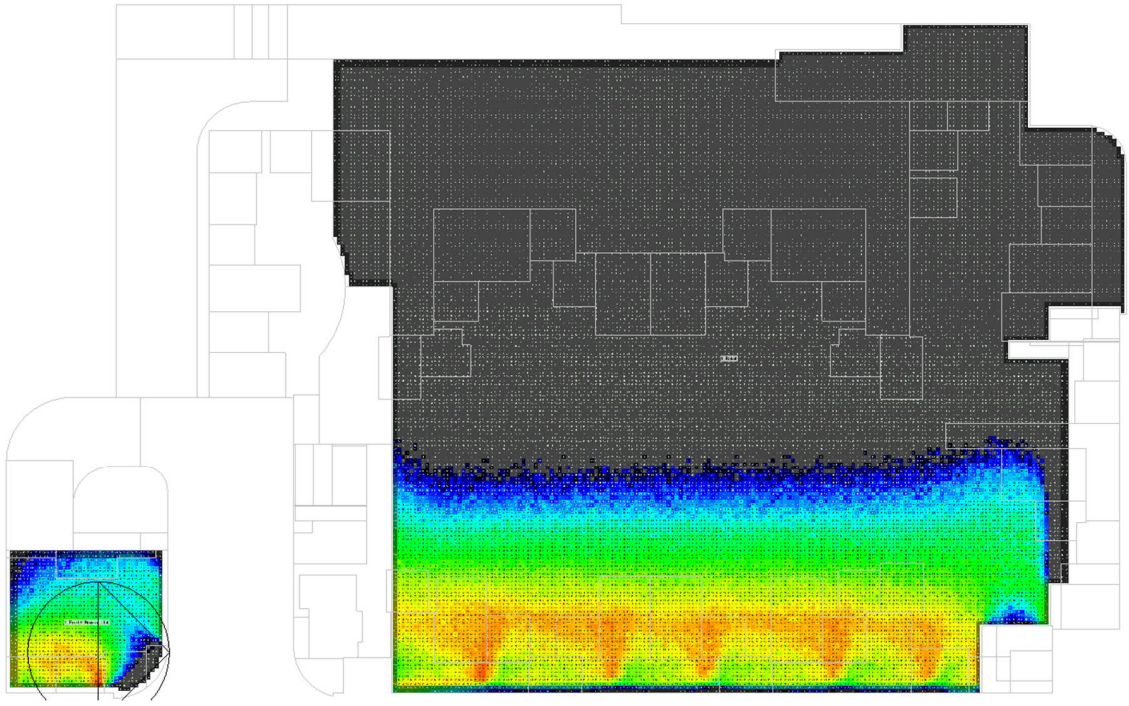


Figure 21: 173 Burke Road Ground Level Daylight Map

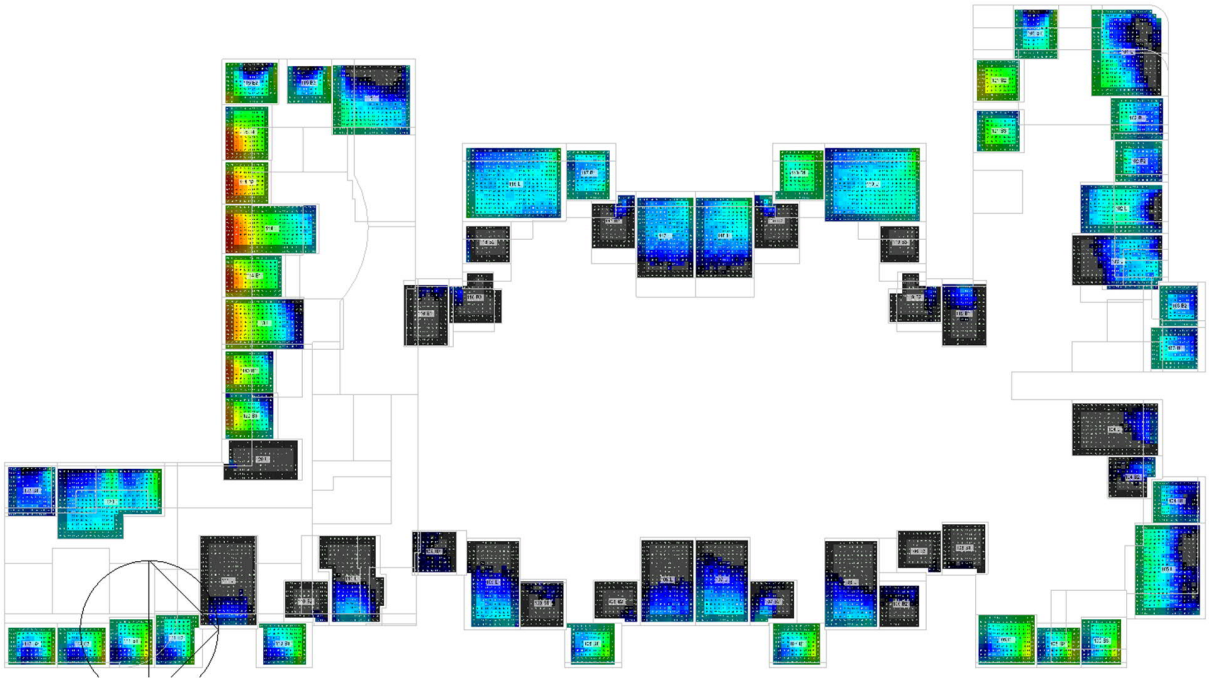


Figure 22: 173 Burke Road Level One Daylight Map

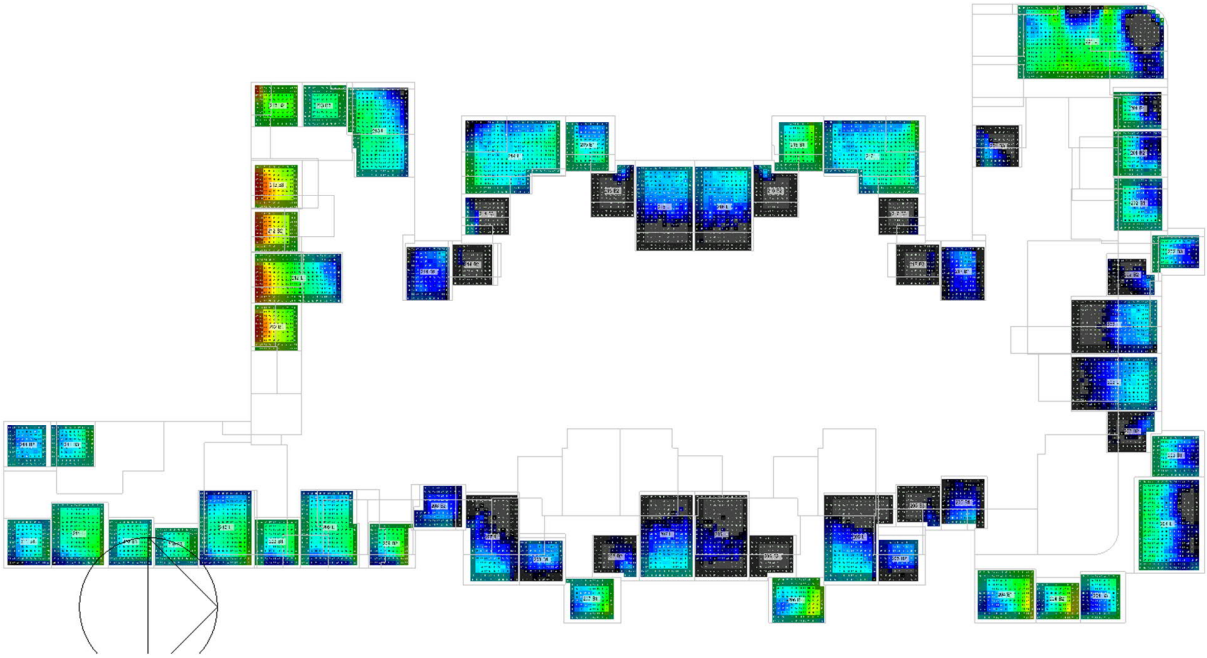


Figure 23: 173 Burke Road Level Two Daylight Map

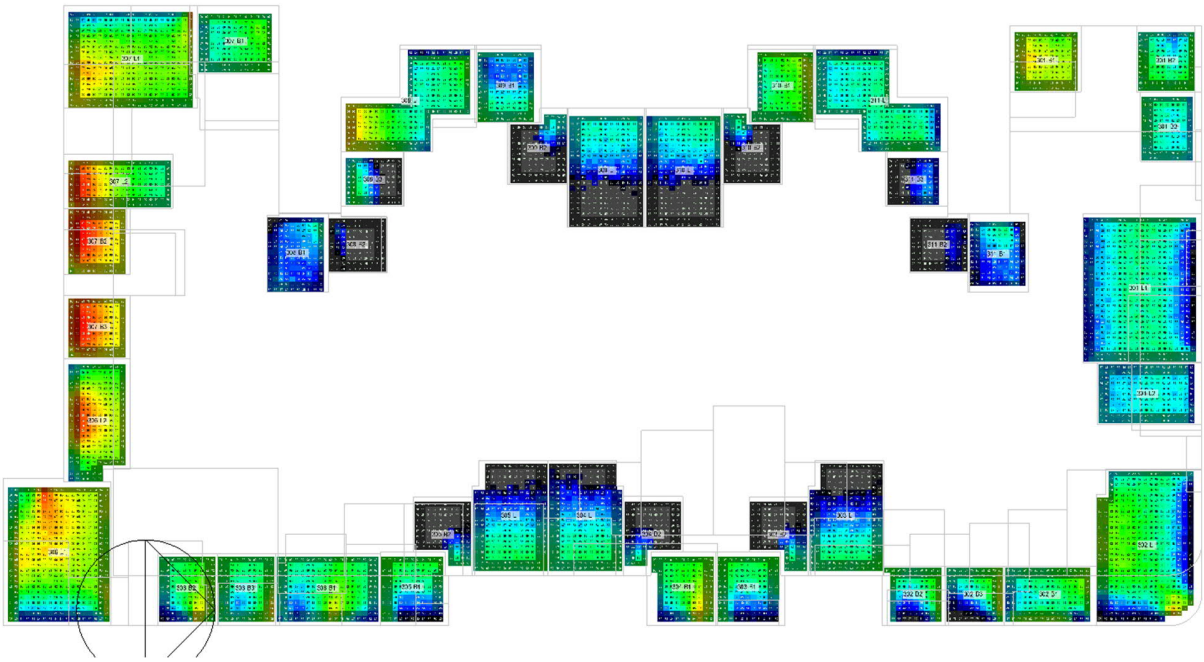


Figure 24: 173 Burke Road Level Three Daylight Map

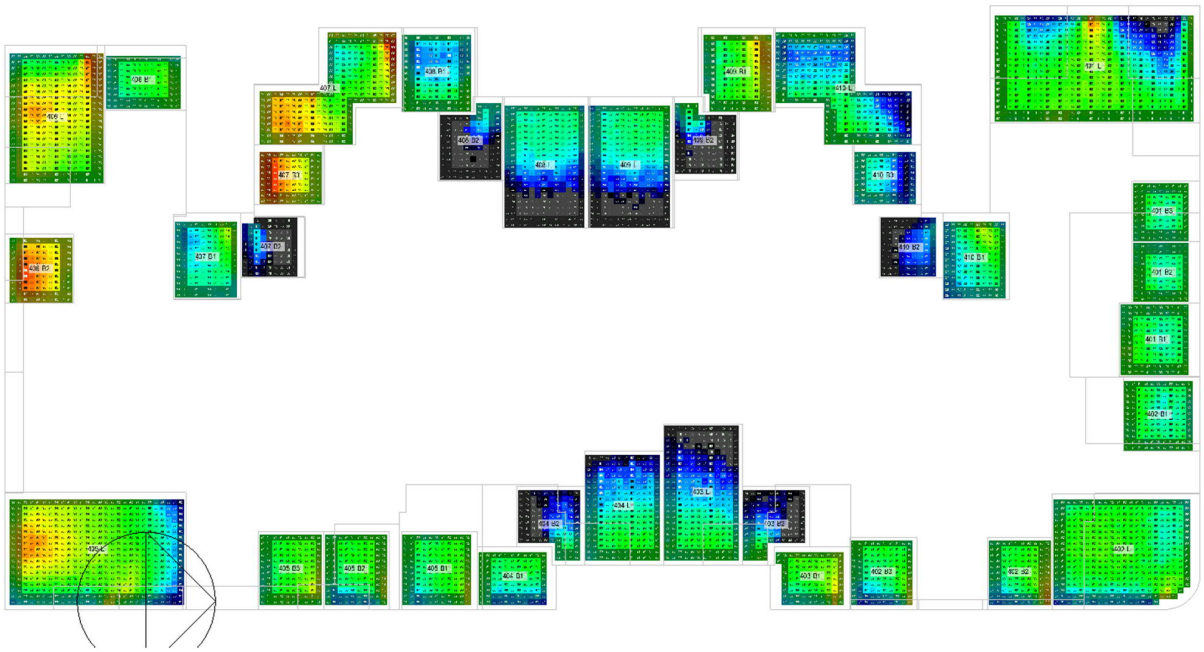


Figure 25: 173 Burke Road Level Four Daylight Map

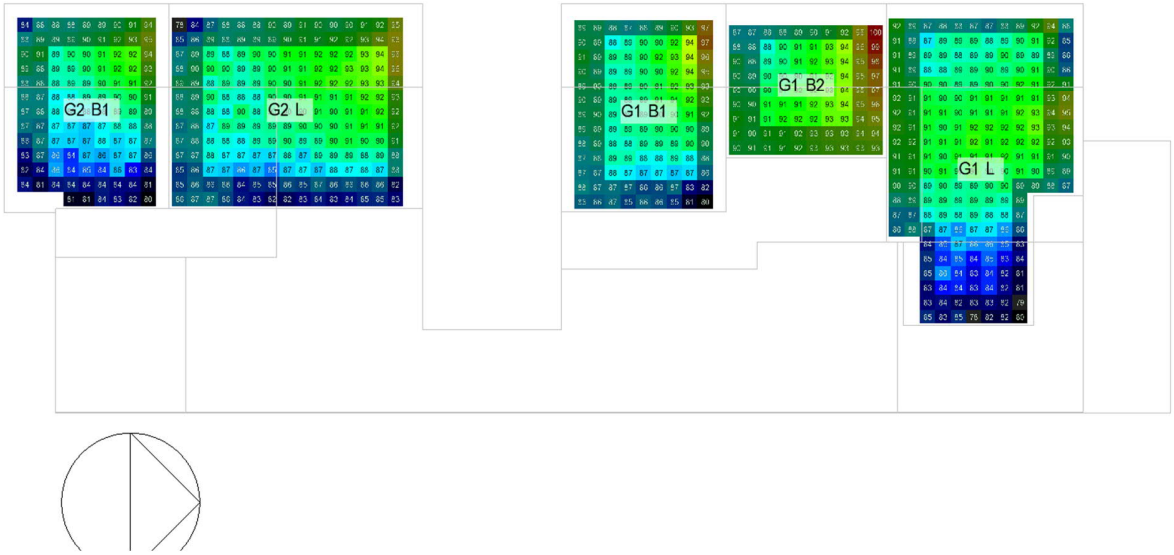


Figure 26: 28 Hope Street Ground Level Daylight Map

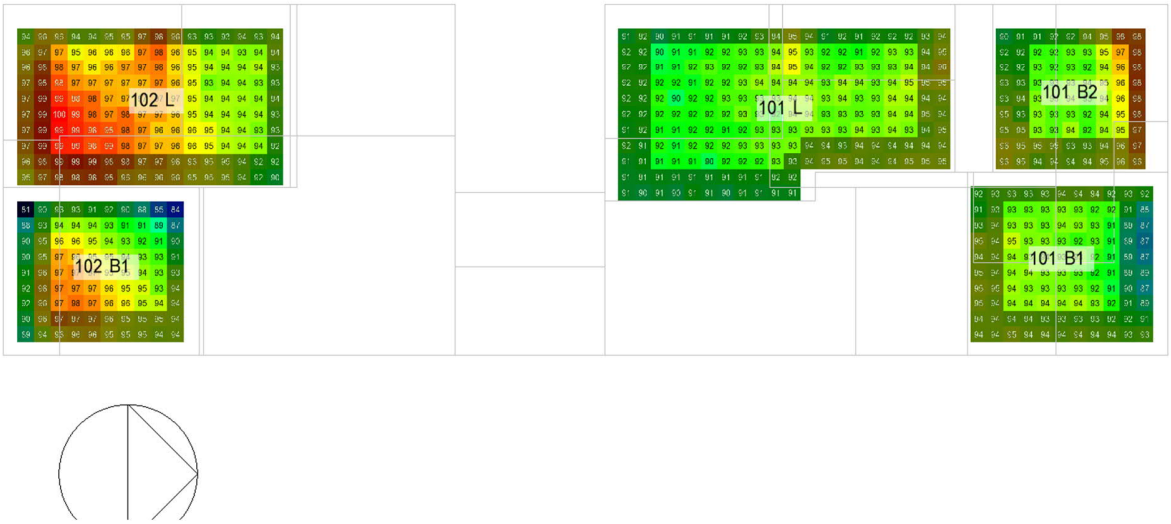


Figure 27: 28 Hope Street Level One Daylight Map

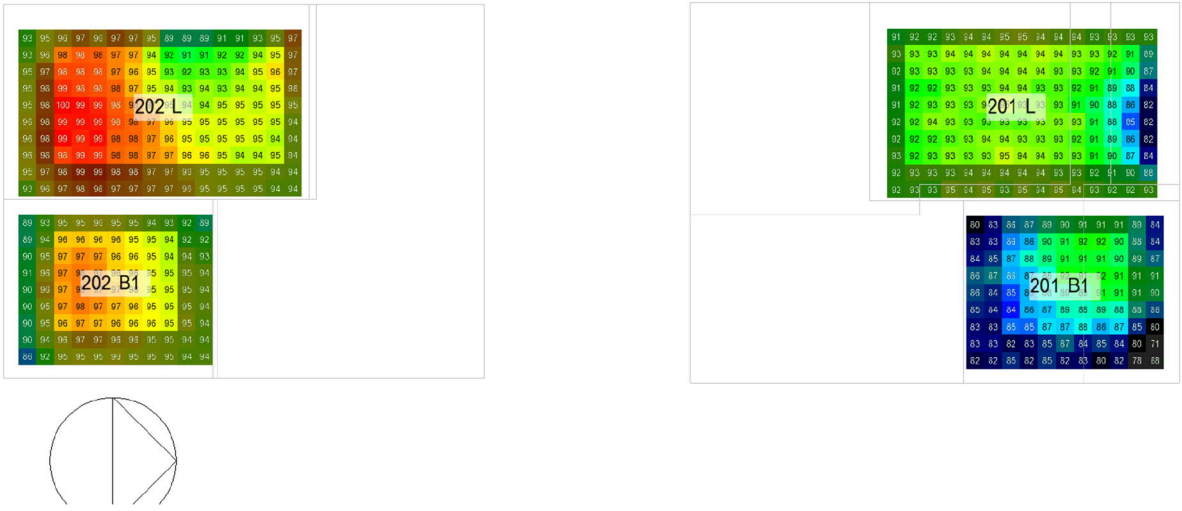


Figure 28: 28 Hope Street Level Two Daylight Map