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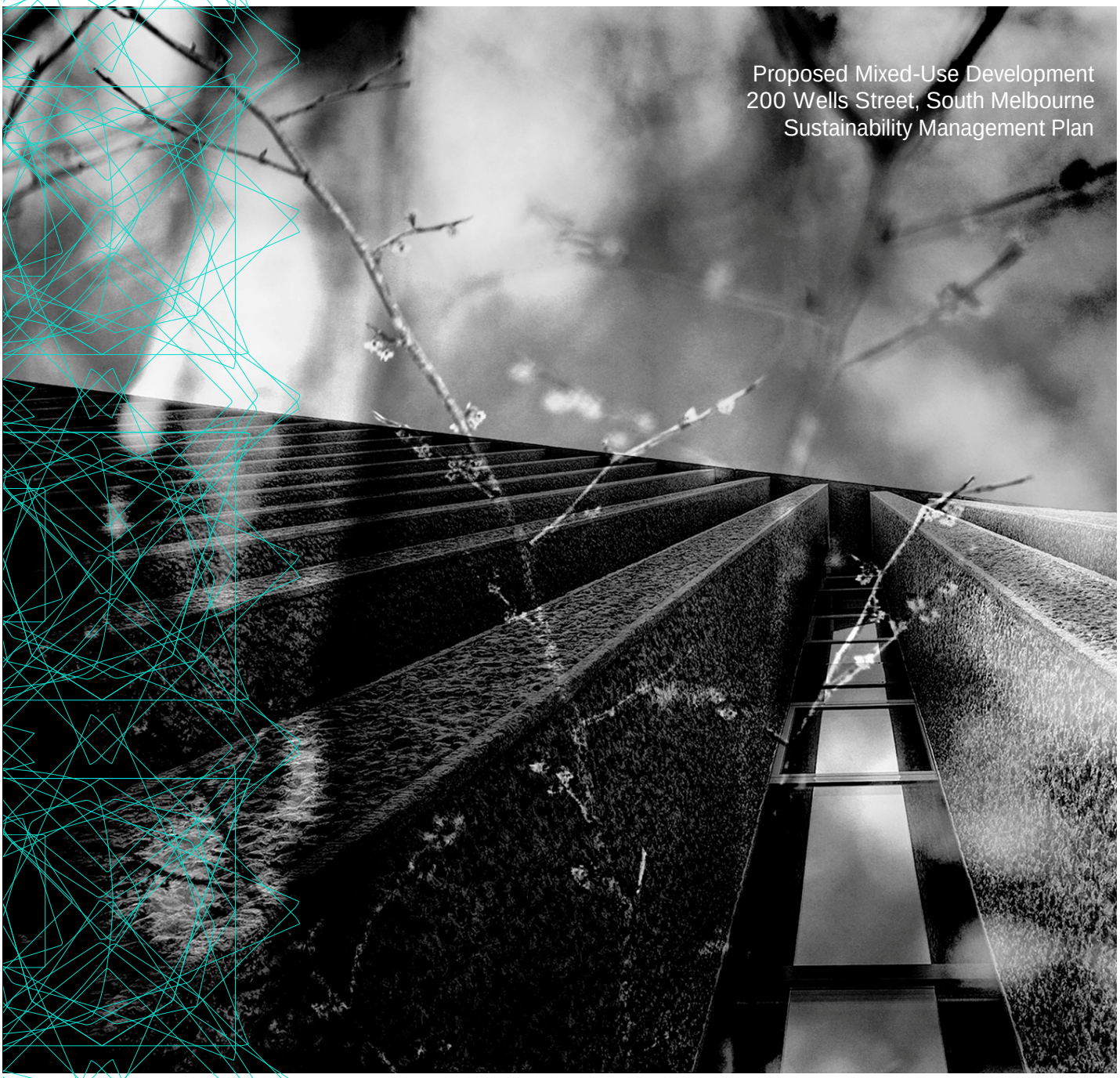

Proposed Mixed-Use Development
200 Wells Street, South Melbourne
Sustainability Management Plan

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

Proposed Mixed-Use Development
200 Wells Street, South Melbourne

Sustainability Management Plan (SMP)

April 2021

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Version	Date of Issue	Description	Author	Reviewed	Approved
V1	17-08-2018	For submission	AB	BdW	BdW
V2	19-11-2018	Updated - Permit Drawings	AB	LR	LR
V3	05-06-2019	Updated in response to council comments	LS	LR	LR
V4	22-04-2021	Updated - Revised plans	BS	LR	LR

Executive Summary

The proposed mixed-use development at 200 Wells Street, South Melbourne, demonstrates 'Australian Best-Practice' with a benchmark 4 Star rating using the Green Star Design & As Built v1.3 tool which assesses the overall ESD features of the development.

The thermal efficiency of the residential building fabric has scored a weighted average energy score of 7.0 Stars, where a sample of apartments were modelled using the modelling software FirstRate5. This meets minimum BCA (National Construction Code) requirements and minimum Green Star building benchmarks.

Best practice stormwater management is demonstrated via preliminary STORM modelling. The project meets stormwater management targets required by the City of Port Phillip with the implementation of a 25,000L rainwater tank(s) which captures the entire roof area and will be connected for toilet flushing for all podium level commercial amenities.

1. Introduction

This Sustainability Management Plan (SMP) has been prepared to assist the design, construction and operation of the proposed mixed-use development at 200 Wells Street, South Melbourne, to achieve a range of sustainable development objectives that have the potential to achieve 'Australian Best-Practice' in accordance with a benchmark of 4 Stars applying the Green Star Design & As Built v1.3 rating tool.

Sustainable Development Consultants has 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 Port Phillip, in particular:

- Clause 21.03 *Ecologically Sustainable Development*;
- Clause 22.12 *Stormwater Management (Water Sensitive Urban Design)*;
- Clause 22.13 *Environmentally Sustainable Development*;
- Clause 52.34 *Bicycle Facilities*; and
- Clause 53.18 *Stormwater Management in Urban Development.*

1.1 Site and Development Description

The site at 200 Wells Street, South Melbourne, is located within the St Kilda Road/Domain Precinct, approximately 3km south of the Melbourne CBD. The site is situated on a corner with street frontages along Park Street, Wells Street and Little Bank Street. The development site has convenient access to numerous amenities, parks, and transport routes; it is within walking distance to the Royal Botanic Garden and Albert Park Lake and tram routes along Park Street, St Kilda Road, and Kings Way. The site is currently occupied by a warehouse building, which will be demolished prior to the construction of the proposed development. The proposed 17-storey development will consist of retail, food and drink premises, office spaces, shared facilities and 81 apartment units.

The development summary is as follows:

Level	Inclusions
Total Site Area	1,543m^2
Basement (1-5)	159 car parking spaces (incl. residential, visitor, retail, office) 139 bicycle parking spaces
Ground Floor	Retail/Food & Beverage Premises (551m^2) Residential Lobby 6 visitor bicycle parking spaces

Level	Inclusions
Level 1	Commercial Tenancy (1,226m^2)
Level 2-3	Commercial Tenancy (1,310m^2)
Level 4	Commercial Tenancy (1,230m^2)
Level 5	6 Apartment Units: • 2 x 2-Bedroom • 4 x 3-Bedroom
Level 6	4 Apartment Units • 3 x 2-Bedroom • 1 x 3-Bedroom
Level 7-15	7 Apartment Units (per floor) • 5 x 2-Bedroom • 2 x 3-Bedroom
Level 16-17	4 Apartment Units (per floor) • 4 x 3-Bedroom

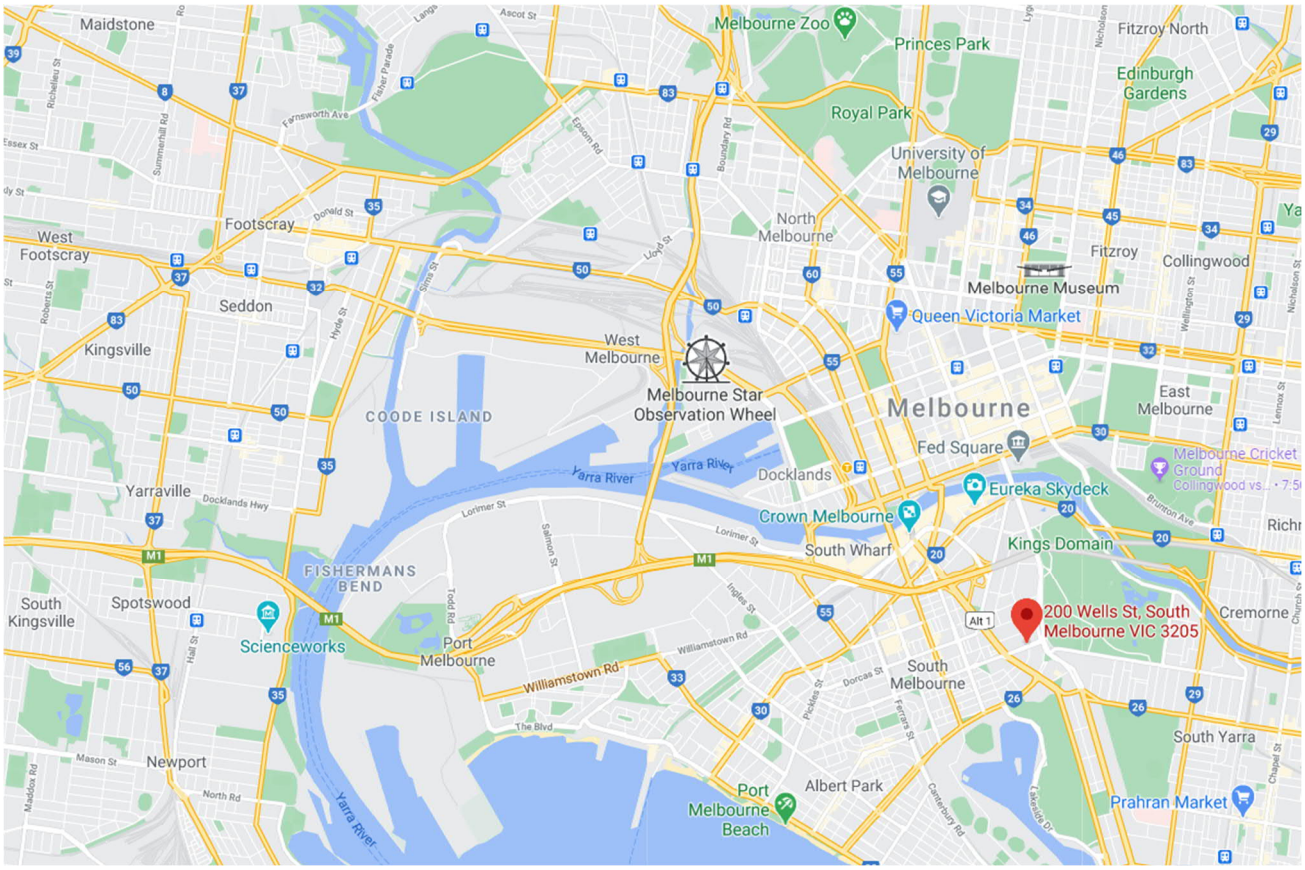

Figure 1: Location of the site in relation to Melbourne CBD (Source: Google Maps)

Figure 2: Aerial view of the site at 200 Wells Street, South Melbourne (Source: Nearmap)

1.2 City of Port Phillip Requirements

The City of Port Phillip requires large projects within their municipality, to include as part of the town planning application, a Sustainability Management Plan (SMP). This SMP captures initiatives to ensure that the ESD requirements of the City of Port Phillip are met, including relevant objectives within Local Policy Clause 22.12 Stormwater Management (Water Sensitive Urban Design) and Clause 22.13 Environmentally Sustainable Development. The City of Port Phillip's Environmentally Sustainable Development policy requires the following sustainability considerations to be addressed:

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

This will be demonstrated in the project by achieving a preliminary design potential benchmark for up to a 4 Star rating under the current version of Green Star Design and As-Built v1.3 rating tool.

1.3 ESD Assessment Tools

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

- Green Building Council of Australia's (GBCA) Green Star Design and As-Built v1.3 tool, which covers the overall sustainability of the development;
- Stormwater Treatment Objective – Relative Measure (STORM) calculator, which addresses stormwater quality considerations for the entire development; and
- FirstRate 5, which covers the thermal efficiency of the building envelope.

All tools have minimum compliance requirements. FirstRate and STORM have requirements that are mandatory for Victoria. Green Star is typically used to demonstrate how a level of compliance has been achieved to meet the typical planning requirements set by the City of Port Phillip.

1.3.1 GREEN STAR DESIGN AND AS BUILT V.1.3 BENCHMARK

The Green Star Design & As-built tool was created by the Green Building Council of Australia (GBCA) to help assess and benchmark new developments against a thorough set of criteria, specifically designed to reward best practice and innovative sustainable design approaches. The tool includes nine (9) different elements which cover all areas of building design and some ongoing operation. These are:

- Management;
- Indoor Environmental Quality;
- Energy;
- Transport;
- Water;
- Materials;
- Land Use and Ecology;
- Emissions; and
- Innovation.

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 Leader". This project is aiming to achieve an outcome in line with a "4 star Green Star". Practices and initiatives identified within this report will be monitored and followed through to construction to ensure the building is designed to the GBCA's "Australian Best-Practice" standard. The results of the Green Star preliminary assessment can be found in Appendix 1 of this report.

1.3.2 MELBOURNE WATER STORM TOOL

Melbourne Water has developed the Stormwater Treatment Objective – Relative Measure (STORM) Calculator to simplify the analysis of stormwater treatment methods. This calculator is designed for the general public to be able to assess simple Water Sensitive Urban Design (WSUD) measures on their property and has been developed specifically for small residential and industrial developments. The STORM Calculator displays the amount of treatment that is required to meet best practice targets, using WSUD treatment measures. The tool is capable of calculating the performance of a range of commonly implemented treatment measures including, rainwater tanks, ponds, wetlands, rain gardens, infiltration systems, buffers and swales[1]. The result of the STORM assessment is included as Appendix 4 of this report.

1.3.3 FIRSTRATE 5

The energy efficiency of the studios will be assessed using FirstRate 5, which is an energy modelling software program to rate studios/dwellings on a 10-Star scale. The tool uses the AccuRate engine to rate dwellings based on climate zone, materials used in a structure, positioning and orientation and building sealing. Higher scores are achieved primarily through better material selection, improvements in glazing, and insulation. It is noted that the BCA (National Construction Code) will apply to this development. The results of the FirstRate5 assessment are found in Appendix 5 of this report.

1.4 Assessment Basis

The assessments for this development have been carried out based on the information provided on architectural drawings:

Architect: Bates Smart

Revision: Date 21-04-2021

2. Sustainability Initiatives

The following sections outline the initiatives which will be included in the development and implemented throughout the design and construction process. Initiatives may be subject to change as the design gets refined for construction; however, the overall 4 Star Green Star rating will be maintained. Initiatives that go towards meeting the Green Star (GS) benchmark have a GS Design and As-Built reference number next to them e.g. (Criteria 1.0, 16.2). Other initiatives do not have this coding. These sections, as well as nominating the sustainability initiatives, also identify the party/parties responsible for implementation of the initiative, and the stage at which implementation will be demonstrated.

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

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

2.1 Building Management

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

Design Requirements	Responsibility & Implementation	Project Stage
Green Star Accredited Professional (GSAP) (1.0)		
One of the project's consultants will be a GSAP. A GSAP will advise the project team through the design and construction phases of the project.	ESD Consultant	Design Development
Environmental Performance Targets (2.0)		
Documented targets will be set for the environmental performance of the building (energy and water). These targets will be monitored and reported on.	ESD Consultant	Design Development
Services and Maintainability Review (2.1)		
A comprehensive services and maintainability review of the project will be conducted during its design stage (prior to construction). This review will be led by the head contractor or the owner's representative.	Builder/ Services Consultant	Commissioning
Building Commissioning (2.2)		
Comprehensive pre-commissioning, commissioning and quality monitoring will be contractually required and building knowledge will be transferred from the design team and contractor to building manager and staff. All commissioning activities will be performed based on approved standards and guidelines (e.g. CIBSE, ASHRAE/AIRAH, etc.). A commissioning plan and specification will need to be prepared by services team.	Builder	Commissioning
Building Systems Tuning (2.3)		
Initial tuning, and ongoing maintenance and monitoring will be undertaken for all building systems included in the development. This will ensure that the systems are operating as intended and performing at optimal efficiency. This commitment must include quarterly adjustments and measurement for the first 12 months following occupation.	Builder/ Services Consultant	Commissioning
Building Operations and Maintenance Information (4.1)		
Comprehensive operations and maintenance information will be developed and made available to the facilities management team. Relevant and current building user information will also be developed and made available to all relevant stakeholders. The information will include descriptions of systems installed in the building, sustainable transport in the area as well as sustainable building operation suggestions relevant to building users.	ESD Consultant/ Services Contractor	Post Occupancy
Environmental Building Performance (5.1)		
A commitment to set targets of performance in energy and water use, and a commitment to measure and report on these results will be made for at least two of the following environmental building performance metrics: • Greenhouse gas emissions – commitment in kg/CO2/m^2;	Building Operator	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
• Potable water usage – kL/person; • Operational waste – kg/person; and • Indoor environment quality – complete occupant comfort surveys, HVAC systems targets and thermal and lighting comfort.		
End of Life Waste Performance (5.2)		
A commitment to reduce demolition waste at the end of life of an interior retrofit will be set for the common areas and commercial tenancies (applying to at least 80% of the GFA).	Builder	Construction Documentation
Monitoring Systems (6.1)		
The design will include electronic metering systems that will be integrated into the building to monitor and report on all energy and water uses. Energy and water consumption will be monitored and reported against set performance targets for the building. In addition, a monitoring system, capable of capturing and processing the data generated by the installed meters, will be provided. The monitoring system should be able to report consumption trends.	Services Engineers	Design Development
Construction Environmental Management (7.0)		
The building contractor will implement a project specific Best Practice Environmental Management Plan—this must be in line with *NSW EMS Guidelines*. This will be in place before starting works and throughout the construction process.	Builder	Construction Documentation
Formalised Environmental Management System (7.1)		
The building contractor for the project will hold an EMS certified by a third-party organisation that provides compliance to ISO 14001 Standards.	Builder	Construction Documentation
High Quality Staff Support (7.2)		
High quality staff support will be put in place for site workers to promote mental and physical health outcomes and knowledge on sustainable practices. This may be through on-site, off-site and/or online educational programs.	Builder	Construction Documentation
Operational Waste (8.0B)		
The waste management of the development will meet the following criteria: • General waste going to landfill; • Recycling streams to be collected by the building's waste collection service, (paper and cardboard, glass, and plastic); and • At least one other waste stream (food organics, e-waste, batteries etc.). The development will be provided with a bin store and a waste area for the separation and storage of general and recycling waste. These areas will be located at basement level, where easily accessible by building residents/staff and waste contractors. All floors of the development will be provided with a dual bin chute system; one chute for recyclables and the other for general waste. This will allow waste to be separated at the point of disposal.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
It is recommended the development provide facilities for the disposal of organic waste. Storage of an organic waste bin could be provided within the waste area. This will facilitate disposal of food scraps from residents, the food & drink premise and offices. Additionally, office tenancies could be provided with a kitchen organic waste bin (e.g. Bokashi bin) for the convenience of staff.		

2.2 Indoor Environmental Quality

Indoor Environment Quality (IEQ) credits address initiatives which help to create a healthy indoor environment free from toxins with ample supply of daylight and outside air.

Design Requirements	Responsibility & Implementation	Project Stage
Ventilation System Attributes (9.1)		
All air handling equipment in the project will meet the following conditions: • Full compliance with ASHRAE Standard 62.1:2013 (to mitigate entry of outdoor pollutants); • Will be easily maintained and cleaned; and • Will be cleaned prior to use and occupation.	Services Consultant	Design Development
Provision of Outdoor Air (9.2)		
Outdoor air rates will be enhanced with the inclusion of operable windows to the residential apartments. For residential apartment units, operable windows will provide sufficient outdoor air to ensure indoor air pollutants are maintained below acceptable levels. Office spaces will be provided with fresh air at a rate of 100% more than recommended in AS1668.2.	Services Consultants	Design Development
Exhaust or Elimination of Pollutants (9.3)		
The enclosed carpark, all kitchens/kitchenettes, and any print rooms in the development will have exhausts which will take air directly out of the building without any recirculation.	Services Consultants	Design Development
Minimum Lighting Comfort (11.0)		
All luminaires will be installed with high frequency ballast, will be flicker free and will have a Colour Rendering Index (CRI) > 80.	Lighting Engineer	Construction Documentation
General Illuminance and Glare Reduction (11.1)		
Best Practice lighting levels will be met and will be in line with AS/NZ 1680.2 for different space types. Internal lights will be fitted with baffles, louvers or diffusers to obscure any direct light source so as to cut out glare. Illuminance levels throughout the development will comply with the requirements of AS/NZ1680.1:2006.	Architect / Lighting Engineer	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Surface Illuminance (11.2)		
For residential apartment units, at least one wall in each living space, kitchen and bedroom will be provided with specific wall-washing or wall mounted fittings.	Architect / Lighting Engineer	Design Development
Localised Lighting Control (11.3)		
Residential apartment units and offices will be provided with sufficient power outlets to allow for future task lighting around predicted furniture layouts. For offices, this requires provisions for individual work stations. Residential apartment units will also be provided with dimmer switches.	Architect / Lighting Engineer	Design Development
Visual Comfort – Glare Reduction (12.0C)		
External screening to podium levels and operable external screening for all residential units will help to reduce glare from sunlight to north, east and south viewing facades. These devices help to meet the intent of glare reduction. Additionally, the development design incorporates extruded slab edges to podium levels, balcony overhangs to all residential units, and a canopy awning to east and south ground floor facades. These shading devices will help to promote visual comfort by providing shelter from direct sunlight into indoor spaces.	Architect	Design Development
Daylight Access		
The development features appropriate window dimensions capable of providing ample natural light into interior spaces. Daylight penetration through windows/openings will be enhanced with the use of light internal colours, allowing for better internal reflection of daylight. All dwellings' bedrooms and living areas will be provided with an external facing window. Daylight penetration will be further enhanced with the use of clear glazing for dwellings.	Architect	Design Development
Views (12.2)		
The project has three street frontages and includes ample visual glazing to create a strong connection to the outside. Therefore, the majority of podium spaces and all residential apartment units are expected to have a clear line of sight to a high quality external view (at least 60% of the nominated commercial and residential floor areas).	Architect	Design Development
Volatile Organic Compounds (13.1)		
All paints, adhesives and sealants, flooring, and wall and ceiling coverings will not exceed limits outlined in Appendix 4. Alternatively, products with no VOCs will be selected.	Architect	Construction Documentation
Formaldehyde Minimisation (13.2)		
All engineered wood products will have 'low' formaldehyde, certified as E0 or better. Alternatively, products with no formaldehyde will be specified.	Architect	Construction Documentation

2.3 Energy

The development will minimise energy use through an efficient hot water system, heating and cooling systems, lighting, and superior building envelope.

Design Requirements	Responsibility & Implementation	Project Stage
Greenhouse Gas Emissions – Conditional Requirement (15.0)		
Greenhouse gas emissions for the development will be reduced through efficient lighting, HVAC design and appropriate building fabric.		
GHG Emissions Reduction – NatHERS Rating Pathway (15B.0), Modelled Pathway (15E.0)		
The residential part of development will achieve a minimum average 6.5 star energy rating with no apartment rating less than 5.5 stars. The residential sample energy ratings achieve an average **7.0 star** rating. The sample energy ratings results and specification of building fabric elements is outlined in the energy rating report provided as Appendix 6. The commercial part of the development will achieve a 5% reduction in total energy consumption between the intermediate and reference buildings through improved building fabric. There will also be a 15% improvement for the proposed building over the benchmark building through the improvement of provided services. The specification of required improvements is provided in the energy rating report in Appendix 2.	Architect	Construction Documentation
Energy Efficient Appliances (15B.1)		
Any appliances provided (fridges, dishwashers, washing machines and clothes dryers) as part of the base building works for the development will be selected within one energy efficiency star of the best available.	Architect	Construction Document
HVAC Systems (15B.1, 15E.1)		
HVAC systems will be sized within 10% of the cooling load and 20% of the heating load and selected within one energy star of best available or COP≥3.5 as a minimum[2].	Services Consultant	Design Development
Hot Water (15B.1, 15E.1)		
Electric heat pump systems with COP≥3.5 will be installed to provide all hot water to the development. The circulating loop will be insulated to minimise heat loses.	Services Consultant	Construction Documentation
Residential and Common Areas Lighting (15B.1)		
Energy consumption from artificial lighting within the development will be reduced with the use of LED lighting and by minimising daylight diffusion. For all residential apartment units and common areas, the lighting power density will be: • 4.5W/m^2 – residential dwellings; and • 4.05W/m^2 – common corridors. Independent light switching must be provided to each room of each residential apartment unit. Functional areas of open plan living, dining and kitchen areas must be separately switched.	Electrical Engineer	Design Development

[2] COP - Co-efficient of Performance; which represents to units of heating or cooling produced for each unit of energy consumed.

Design Requirements	Responsibility & Implementation	Project Stage
All common areas will be provided with automated lighting controls (e.g. time clocks, motion/daylight sensors).		
Non-Residential and Common Area Lighting (15E.1)		
Energy consumption from artificial lighting within the development will be reduced with the use of LED lighting and by minimising daylight diffusion. The development will limit lighting levels to: • 12.6W/m^2 – retail; • 4.05W/m^2 – office; • 12.6W/m^2 – restaurant/café; • 2.7W/m^2 – amenities; and • 1.8W/m^2 – shared carpark (excludes entry zone). Motion sensors will be installed in all areas with sporadic use, such as storage areas, waste room etc. All external lighting will have appropriate controls (e.g. time clocks, motion/daylight sensors) to minimise consumption during off-peak times.	Electrical Engineer	Design Development
Section J Energy Efficiency Assessment		
A BCA JV3 modelling exercise will be conducted at the building approval stage for the commercial components of the development to achieve a minimum 20% improvement on energy use compared to Green Star reference building. This will be achieved with the specification of a thermally efficient building envelope and efficient building services that exceed deemed-to-satisfy requirements. The thermal modelling report can be provided to council as part of the ESD Implementation documentation to ensure this commitment is carried through.	Architect	Construction Documentation
Building Sealing		
All windows, doors, exhaust fans and pipe penetrations will be constructed to minimise air leakage as required by the provisions outlined in Section J3 of the BCA. This will include the use of seals around operable windows and doors, as well as caulking to pipe penetrations, and the addition of self-closing louvers or dampers to exhaust fans.	Architect	Design Development
Carpark and Common Area Ventilation		
Carpark and common area ventilation will be designed to best practice energy efficiency, with all exhaust fans being installed with carbon monoxide (CO) sensors so as to ensure they only operate when necessary.	Mechanical Engineer	Construction Documentation

2.4 Transport

The development is located close to the Melbourne CBD, with convenient access to public transport options and numerous amenities within walking distance.

Design Requirements	Responsibility & Implementation	Project Stage
Access to Public Transport (17.B.1)		
The Wells Street development site has direct access to the following public transport options within walking distance: Buses • 216: Caroline Springs – Brighton Beach • 219: Sunshine South – Gardenvale • 220: Sunshine – Gardenvale • 234: Garden City – City • 236: Garden City – Queen Victoria Market • 605: Flagstaff Station – Gardenvale Trams • 1: East Coburg – South Melbourne Beach • 3: Melbourne University – East Malvern • 5: Melbourne University – Malvern • 6: Melbourne University – Glen Iris • 16: Melbourne University – Kew via St Kilda Beach • 58: West Coburg – Toorak • 64: Melbourne University – East Brighton • 67: Melbourne University – Carnegie • 72: Melbourne University – Camberwell Train • Alamein, Belgrave, Craigieburn, Cranbourne, Showgrounds/Flemington Racecourse, Frankston, Glen Waverley, Hurstbridge, Lilydale, Pakenham, Sandringham, South Morang, Sunbury, Upfield, Werribee and Williamstown Lines: accessible via Flinders Street Railway Station (Approx. 1.7km walking distance)	N/A – Inherent in Location	
Active Transport Facilities		
The development provides a total of 145 bicycle parking spaces: • 139 x spaces across the basement levels; and • 6 x spaces at ground floor.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Walkable Neighbourhoods (17B.5)		
The project's site has been assessed using the "Walk Score" locational performance tool which assesses locations according to the number of facilities within close proximity and provides a score between 1 and 100. High Walk Scores above 90+ indicate that visitors and staff can complete daily errands without requiring a car. The Wells Street development achieves a score of 97 out of 100, which is classified as "Walker's Paradise."	N/A – Inherent in Location	

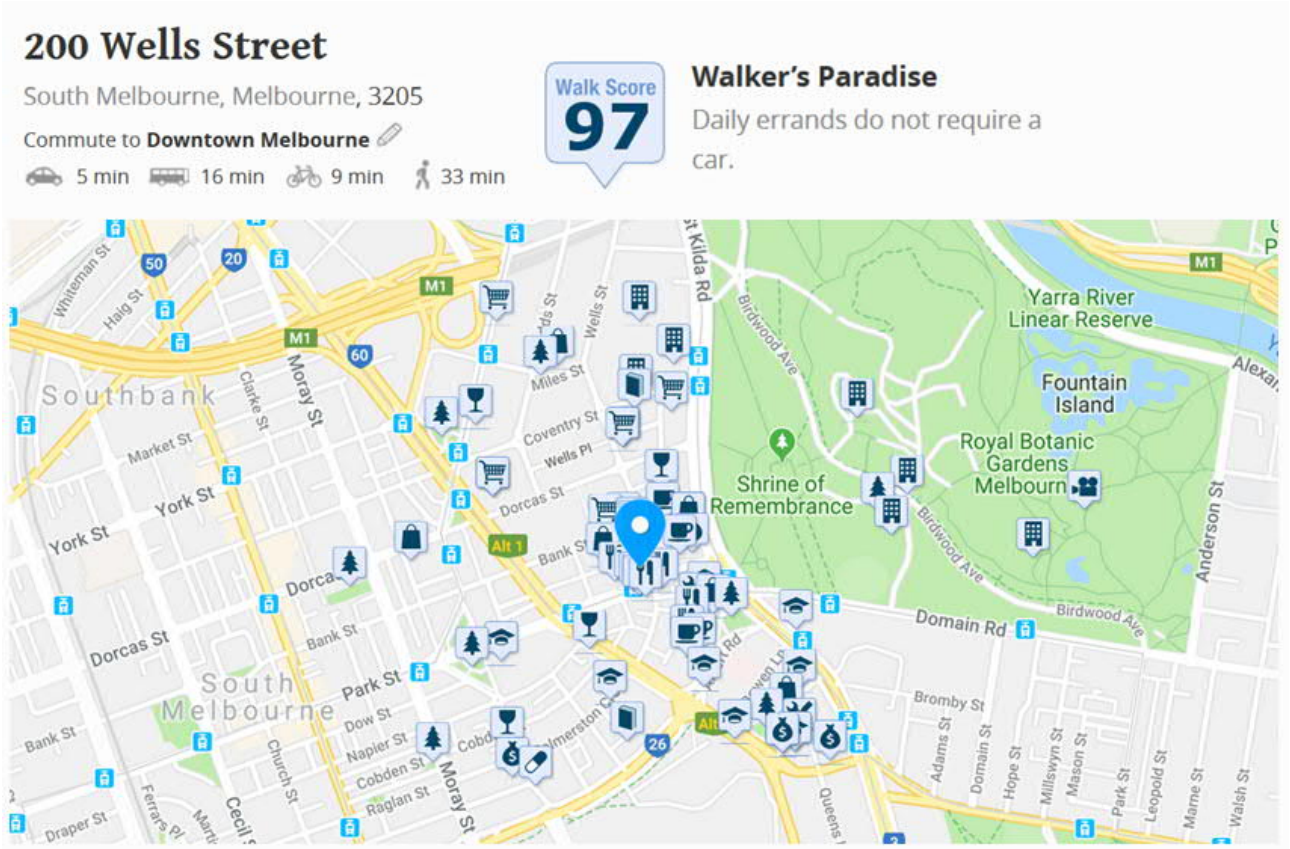

Figure 3: Walkscore result and map showing surrounding amenities (Source: walkscore.com)

2.5 Water

Water will be used efficiently in the development through installation of efficient fixtures and fittings, and via collection and use of rainwater which helps to reduce mains water requirements and diverts stormwater from drains during rainfall events.

Design Requirements	Responsibility & Implementation	Project Stage
Sanitary Fixture Efficiency (18A)		
All fixtures and fittings installed within the Wells Street development will be specified with the following Water Efficiency Labelling Scheme (WELS) star ratings: • Toilets – 4 Star; • Taps – 6 Star; • Showerhead – 3 Star (<6.5L/min) • Urinals (if any)– 6 Star; and • Dishwashers – 4 Star. • Clothes Washing Machines – 3.5 Star.	Architect / Contractor	Construction Documentation
Rainwater Reuse (18A)		
The entire Level 17 roof will be designed to capture rainwater runoff to be stored in a tank(s) with a minimum effective capacity of 25,000L. The proposed location of the tank(s) is below ground at basement level. The rainwater will be connected for toilet flushing for all podium level amenities (with connections to the equivalent demand of 100 occupants). This includes the ground floor retail, food & drink premises, and the office amenities. The stored water will also be utilised for on-site irrigation of planters on Level 5.	Contractor	Design Development
Landscape Irrigation (18A)		
No potable water will be used for landscape irrigation. Irrigation will be provided by a subsurface drip irrigation system with moisture sensor, connected to the rainwater tank.	Hydraulic Consultant	Design Development

2.6 Building Materials

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

Design Requirements	Responsibility & Implementation	Project Stage
Dematerialisation		
Where practical, components of the development (e.g. joinery) will be pre-manufactured off-site then delivered during construction.	Builder	Construction Documentation
Structure and Reinforcing Steel (20.1)		
At least 95% (by mass) of all steel used in the building's structure will be sourced from an environmentally Responsible Steel Maker[3], and: • At least 60% of the structural steel will be sourced from a steel fabricator/contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI); or • At least 60% of the reinforcing bar and mesh is produced using energy-reducing processes.	Builder	Construction
Timber (20.2)		
At least 95% (by cost) of timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified; or recycled / reused.	Architect	Construction Documentation
Permanent Formwork, Pipes, Flooring, Blinds and Cables (20.3)		
At least 90% of all cable, pipe, floor and blind products installed in the building (by cost) will not contain PVC; or will comply with the Best Practice Guidelines for PVC by being procured from a manufacturer with an ISO 14001 certified EMS for manufacturing processes.	Architect	Construction Documentation
Construction and Demolition Waste: Percentage Benchmark (22B)		
At least 90% (by weight) of the waste generated during construction and demolition will be diverted from landfill.	Architect	Construction Documentation

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

2.7 Land Use and Ecology

Land use and ecology aims to create more green spaces and improve the outdoor environment for a range of health, social, environmental, biodiversity and economic benefits.

Design Requirements	Responsibility & Implementation	Project Stage
Endangered, Threatened or Vulnerable Species (23.0 & 23.1)		
The land has been previously built on; therefore there is no environmental degradation of environmental attributes due to the development of the site, and the site will as a minimum maintain its current ecological value. The Wells Street development incorporates soft landscaping with planters surrounding the perimeter of the fifth floor terrace (approximately 100m^2). This will contribute to the site's greenspace and an improvement in the ecological value as compared to the existing conditions.	N/A – Inherent in Location	
Sustainable Sites – Conditional Requirement (24.0)		
At the time of purchase, the site did not include an old growth forest, or a wetland of "High National Importance", or did not impact on a Matter of National Significance, or have to be referred to the Federal Environment Minister as a "controlled action".	ESD Consultant	Schematic Design
Reuse of Land (24.1)		
At the date of purchase, the site was Previously Developed Land.	N/A – Inherent in Location	
Contamination and Hazardous Materials (24.2)		
The Wells Street site is currently occupied by a single storey brick warehouse building, which will be demolished to allow for construction of the development. If required, a comprehensive hazardous materials survey will be carried out on the existing development on the project site, in accordance with the relevant Environmental and Occupational Health and Safety (OH&S) legislation. Any asbestos, lead or PCBs identified in the existing building will be stabilised, removed and disposed of in accordance with best practice guidelines.	Civil Engineer	Construction
Heat Island Effect (25.0)		
At least 75% of the development site area will be composed of elements and materials that reduce the heat island effect. This includes roof and vegetation i.e. planters. All roofing materials will have a three year SRI >64 (for roof pitched <15°). Additionally, light coloured pavers with a three year SRI of >34 is recommended for the outdoor terrace (fifth floor).	Architect	Design Development

2.8 Emissions

Emissions initiatives included in the development aim to reduce the impacts of 'point source' pollutants from the project. This includes chemical, biological, and physical pollutants (e.g. light pollution).

Design Requirements	Responsibility & Implementation	Project Stage
Reduced Peak Discharge (26.1) and Stormwater Pollution Targets (26.2)		
The Wells Street development achieves a STORM score of 102%, with the implementation of 25,000L rainwater tank(s) connected for toilet flushing to the equivalent demand of 100 occupants. This demonstrates the development meets best-practice stormwater pollution targets, and will ensure that the post-development peak event discharge from the site does not exceed the pre-development peak event discharge.	Civil / Hydraulic Engineer	Construction Documentation
Rainwater Collection & Reuse		
All non-trafficable roof areas will be used to collect stormwater runoff to be stored in rainwater tank(s) of a minimum capacity of 25,000L. The harvested water will be used for toilet flushing in all podium level amenities. The stored water will also be utilised for on-site irrigation of planters.	Architect / ESD Consultant	Design Development
Light Pollution to Neighbouring Bodies (27.0)		
All external lighting will comply with AS4282:1997 'Control of the Obtrusive Effects of Outdoor Lighting'.	Architect	Schematic Design
Light Pollution to Night Sky (27.1)		
No external luminaire on the project will have an Upward light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation. This will be achieved through appropriate selection of light fittings, such as lights with hoods or baffles to avoid upward light output.	Architect	Schematic Design
Insulant ODP		
All thermal insulants in the development will be specified to avoid the use of ozone-depleting substances in both their manufacture and composition.	Services Consultants	Construction Documentation

2.9 Innovation

Innovation initiatives aim to demonstrate that the project is applying sustainability principles in a broader sense than just on a project scale. The initiatives demonstrate a beyond best practice commitment to sustainability principles.

Design Requirements	Responsibility & Implementation	Project Stage
Improving Green Star Benchmarks		
The project team will attempt to achieve more than 50% of all paints used in the project having a maximum TVOC content of 5g/L – 1 point.	Builder / Project Manager	Construction Documentation
Innovation Challenges		
Financial Transparency		
The Wells Street development will complete the Green Star Financial Transparency Disclosure Template, which itemises design, construction, documentation and project costs associated with the Green Star initiatives included in this report.	Builder / Project Manager	Construction Documentation
Contractor Education		
Contractor education in sustainability practices will be carried out. The team will aim to train at least 80% of all contractors and subcontractors working on site in basic ESD principles.	Builder / Project Manager	Construction Documentation
Local Procurement		
A percentage of the products and materials used in the project will be produced and manufactured in Australia. Alternatively, a percentage of the services and skilled labour employed by the project will come from the local area surrounding the site.	Builder / Project Manager	Construction Documentation
Energy Metering Integrity		
All meters and sub-meters installed in the project will be validated according to a recognised standard or practice, such as NABERS protocol and NMI standards	Builder / Project Manager	Construction Documentation

3. Implementation of Initiatives

The proposed mixed-use residential development at 200 Wells Street, South Melbourne, is expected to achieve a benchmark 'Best-Practice' Green Star rating and meet the City of Port Phillip's planning requirements through a number of initiatives; such as the superior performance of the building's thermal envelope; reductions in greenhouse gas emissions through the use of efficient air conditioners and lighting; as well as reduced environmental impact during the construction stage through the specification of environmentally preferred materials and a construction team that works in accordance with a construction EMP that is tailored to the site and the project.

The initiatives that have been included within this SMP may be subject to change during design development. However, the overall 4 Star (Australian Best-Practice) Green Star rating will be maintained. All initiatives proposed in this report have a proven track record to serve their individual purpose and can be easily maintained with any failures obvious to the occupants of the development. This helps to ensure the ongoing sustainability of the development as the systems installed in the beginning are maintained for purpose throughout the life of the development.

With appropriate implementation, management, monitoring, and maintenance the initiatives outlined within this SMP will serve to provide a development with lower running costs, as well as benefiting the environment.

Appendix 1 – Green Star Design & As Built v1.3 Credit Summary

Green Star - Design & As Built Scorecard

Project:	200 Wells Street South Melbourne	**Round:**	1
Targeted Rating:	4 Star - Best Practice		

Points Available (Targeted)	Project Score (Targeted)
100.0	47.6

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CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA		POINTS AVAILABLE	POINTS TARGETED
Management					**14**	
Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as	1.1	Accredited Professional		1	1
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets		-	Complies
		2.1	Services and Maintainability Review		1	1
		2.2	Building Commissioning		1	1
		2.3	Building Systems Tuning		1	1
		2.4	Independent Commissioning Agent		1	
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan		2	
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information		1	1
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance		1	1
		5.2	End of Life Waste Performance	A. Contractual Agreements	1	1
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering		-	Complies
		6.1	Monitoring Systems		1	1
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan		-	Complies
		7.1	Environmental Management System		1	1
		7.2	High Quality Staff Support		1	1
Operational Waste	B. Prescriptive Pathway	8A	Performance Pathway: Specialist Plan		0	0
		8B	Prescriptive Pathway: Facilities		1	1
Total					**14**	**11**

Indoor Environment Quality						
					17	
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes		1	1
		9.2	Provision of Outdoor Air	☐ A. Comparison to Industry Standards ☐ B. Performance Based Approach ☐ C. Natural Ventilation	2	1
		9.3	Exhaust or Elimination of Pollutants	☐ A. Removing the Source of Pollutants ☐ B. Exhausting the Pollutants Directly to the Out	1	1
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels		1	
		10.2	Reverberation		1.00	
		10.3	Acoustic Separation	A. Sound Reduction	1.00	
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort		Complies	Complies
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	☐ A. Non Residential Spaces ☐ B. Residential Spaces	1.00	1
			11.1.2 Glare Reduction	☐ A. Prescriptive Method 1 ☐ B. Prescriptive Method 2 ☐ C. Performance Method		
		11.2	Surface Illuminance	☐ A. Prescriptive Method ☐ B. Performance Method ☐ C. Residential Spaces (Prescriptive Method)	1.00	1
		11.3	Localised Lighting Control		1.00	1
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	☐ A. Fixed Shading Devices ☐ B. Blinds or Screens ☐ C. Daylight Glare Model	Complies	Complies
		12.1	Daylight	☐ A. Prescriptive Methodology ☐ B. Compliance Using Daylight Factor ☐ C. Compliance Using Daylight Autonomy	2	
		12.2	Views		1	1
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	☐ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Paints, Adhesives or Sealants	1.00	1
			13.1.2 Carpets	☐ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Carpets		
		13.2	Engineered Wood Products	☐ A. Product Certification ☐ B. Laboratory Testing	1.00	1
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	☐ A. Naturally Ventilated Spaces ☐ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces	1	
		14.2	Advanced Thermal Comfort	☐ A. Naturally Ventilated Spaces ☐ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces ☐ D. Industrial spaces	1	
Total					17	9

Energy						
					22	
Greenhouse Gas Emissions	E. Reference Building Pathway	15D.0	Conditional Requirement: NABERS Pathway		-	
		15D.1	NABERS Energy Greenhouse Gas Emissions Reduction		0	
		15D.2	Off-Site Renewables		0	
		15D.3 Additional Prescriptive Measures	15D.3.1 Transition Plan		0	
			15D.3.2 Fuel Switching		0	
			15D.3.3 On-Site Storage		0	
		15E.0	Conditional Requirement: Reference Building Pathway		-	Complies
		15E.1	GHG Emissions Reduction: Building Fabric		4	1
		15E.2	GHG Emissions Reduction		16	4
		15E.3	Off-Site Renewables		8	
		15E.4	District Services		7	
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan		1	
			15E.5.2 Fuel Switching		2	
			15E.5.3 On-Site Storage		1	
Peak Electricity Demand Reduction	A. Prescriptive Pathway	16A	Prescriptive Pathway: On-Site Energy Generation		1	
		16B	Modelled Performance Pathway: Reference Building		0	
Total					21	5

Transport						10	
Sustainable Transport	B. Prescriptive Pathway	17A	Performance Pathway			0	
		17B.1	Access by Public Transport			3	2
		17B.2	Reduced Car Parking Provision			1	
		17B.3	Low Emission Vehicle Infrastructure	A. Parking for Fuel-Efficient Vehicles		1	0
		17B.4	Active Transport Facilities			1	
		17B.5	Walkable Neighbourhoods	A. Proximity to Amenities		1	1
		17C.1	Access by Public Transport			0	
		17C.2	Reduced Car Parking Provision			0	
		17C.3	Low Emission Vehicle Infrastructure	☐ A. Parking for Fuel-Efficient Vehicles ☐ B. Parking for Electric Vehicles ☐ C. Parking for Car Share Vehicles ☐ D. No Parking Spaces Provided ☐ E. Low Emission Facility Transport		0	
		17C.4	Active Transport Facilities			0	
		17C.5	Proximity to Amenities			0	
Total						7	3

Water						12	
Potable Water	A. Performance Pathway	18A	Potable Water - Performance Pathway			12	3.6
		18B.1	Sanitary Fixture Efficiency			0	
		18B.2	Rainwater Reuse			0	
		18B.3	Heat Rejection			0	
		18B.4	Landscape Irrigation			0	
		18B.5	Fire Protection System Test Water			0	
Total						12	3.6

Materials							
						14	
Life Cycle Impacts	B. Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment			0	
		19A.2	Additional Reporting	☐ A. Additional Life Cycle Impact Reporting ☐ B. Material Selection Improvement ☐ C. Construction Process Improvement ☐ D. LCA Design Review		0	
		19B.1 Concrete	19B.1.1 Portland Cement Reduction			2	
			19B.1.2 Water Reduction			0.5	
			19B.1.3 Aggregates Reduction	A. Course Aggregate Reduction		0.5	
		19B.2 Steel	A. Reduced Mass of Steel Framing	A. High Strength Steel		1	
		19B.3	Building Reuse	19B.3.1 Façade Reuse		2	
				19B.3.2 Structure Reuse		2	
		19B.4	Structural Timber	19B.4.0 Responsible Sourcing		-	
				19B.4.1 Reduced Embodied Impacts		3	
		19C.1 Concrete	19C.1.1 Portland Cement Reduction			0	
			19C.1.2 Water Reduction			0	
			19C.1.3 Aggregates Reduction	A. Course Aggregate Reduction		0	
		19C.2 Steel	19C.2.1 Reduced Mass of Steel Framing	A. High Strength Steel		0	
			19C.2.2 Reduced Use of Steel Reinforcement			0	
		19C.3	Building Reuse	19C.3.1 Façade Reuse		0	
				19C.3.2 Structure Reuse		0	
		19C.4	Structural Timber	19C.4.0 Responsible Sourcing		-	
				19C.4.1 Reduced Embodied Impacts		0	
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	20.1.0 Responsible Steel Maker		-	Complies
				A. Responsible Steel Fabricator		1	1
		20.2	Timber	☐ A. Certified Timber ☐ B. Reused Timber		1	1
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	A. Products That Do Not Contain PVC		1	1
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	☐ A. Reused Products ☐ B. Recycled Content Products ☐ C. Environmental Product Declarations (EPDs) ☐ D. Third Party Certification ☐ E. Stewardship Programs		3	
Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy	A. Compliance Verification Summary		-	
		22A	Fixed Benchmark			0	
		22B	Percentage Benchmark			1	1
Total						12	4

Land Use & Ecology						6	
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	A. EPBC		-	Complies
		23.1	Ecological Value			3	
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement			-	Complies
		24.1	Reuse of Land	A. Previously Developed Land		1	1
		24.2	Contamination and Hazardous Materials	☐ A. Site Contamination ☐ B. Hazardous Materials		1	1
Heat Island Effect	To encourage and recognize projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction			1	1
Total						6	3

Emissions						5	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge			1	1
		26.2	Stormwater Pollution Targets			1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies			-	Complies
		27.1	Light Pollution to Night Sky	A. Control of Upward Light Output Ratio (ULOR)		1	1
Microbial Control: Legionella Impacts from Cooling Systems	A. Natural Ventilation	28A	Natural Ventilation			1	
		28B	Waterless Heat Rejection Systems			0	
		28C	Water-Based Heat Rejection Systems			0	
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	A. Calculating TSDEI		1	1
Total						5	4

Innovation				10	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process	10	1
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in	30B	Market Transformation		
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks		
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge		4
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope	30E	Global Sustainability		
Total				10	5

TOTALS	TARGETED
CORE POINTS	42.6
INNOVATION POINTS	5.0
NA POINTS	0.0
POINTS AVAILABLE	100.0
PROJECT SCORE	47.6

Appendix 2 – Green Star Design & As Built v1.3 Greenhouse Gas Emissions Calculator

Green Star Design & As Built

Greenhouse Gas Emissions Calculator

greenstar Developed by the Green Building Council of Australia

User Input Cells

This calculator addresses criterion '15B GHG Emissions Reduction - NaTHERS Pathway' and '16A Prescriptive Pathway - Onsite Energy Generation'.

15B NatHERS Pathway

15B.0 Conditional Requirement

Targeted Green Star Rating	4 Star	

15B.1 Thermal and Energy Performance

Project input

Legislated Minimum Development Average Rating	6	star
Legislated Minimum Worst-Case Apartment Rating	5	star
Project Average Energy Intensity	82.65	MJ/m²
Project Worst-Case Energy Intensity	118.4	MJ/m²
NatHERS Climate Zone	21	
Ventilation and Comfort strategy	Mechanical Heating/Cooling	
Which is provided? Heating, cooling or both?	Both	
If Mixed, proportion of apartments with natural ventilation	100%	
Building total nominal occupancy	193	

Benchmark Building Information		
Minimum Average Benchmark	6.5	star
Minimum Worst-Case Benchmark	5.5	star
Benchmark Energy Intensity	98.0	MJ/m²
Worst Case Energy Intensity Benchmark	131.0	MJ/m²
Energy Intensity at NatHERS 10-star	2.0	MJ/m²

Energy Intensity Conditional Requirement met?	PASS
Worst Case Unit Conditional Requirement met?	PASS
Performance Improvement	16%

15B.2 Building Services and Appliances

15B.2.1 Lighting	
Lighting power density is reduced by at least 10% below the maximum lighting power density allowable in Table J6.2a in both sole-occupancy units and all common areas accessible by residents	Yes
Independent light switching is provided to each room of each sole-occupancy unit. Where open-plan living, dining and kitchen areas are provided, each functional area is separately switched	Yes
All common areas accessible by residents are provided with automated lighting control system(s), such as occupant detection and daylight adjustment.	Yes
15B.2.2 Ventilation and Air Conditioning	
15B.2.2A Mechanically Conditioned Spaces	**Yes**
Please enter the energy star rating for the air conditioning equipment (as per AS 3823.2-2013); and	5
The rated cooling or heating capacity of the unit does not exceed the design cooling or heating load, whichever is greater, by more than 15% or the project team has demonstrated that they have selected the unit with the closest capacity available on the market.	Yes
15B.2.2B Spaces With Mechanical Heating Only	**Yes**
Please enter the energy star rating for the heating equipment (as per AS 3823.2-2013, AS 4552-2005 or AS 4556-2011 as appropriate); and	5
The rated capacity of the heating equipment does not exceed the design heating load by more than 20%.	Yes
15B.2.2C Natural Ventilated Spaces	**No**
Compliance is achieved with the *Provision of Outdoor Air* (9.2C) criterion	Yes
Effective cross ventilation is provided in all apartments	No
Ceiling fan installed in all apartments	No
15B.2.3 Domestic Hot Water	
Please enter the total capacity of installed solar thermal heating system (total RECs)	
The domestic hot water systems are powered by one of the following heat sources: • Renewable Energy; • Electric heat pump with a minimum coefficient of performance (COP) of 3.5 under design conditions; or • Waste heat or heat recovered from another process.	Electric heat pump (COP>=3.5)
15B.2.4 Appliances and Equipment	
Refrigerators achieve a minimum Energy Rating of 1 star below the maximum available rating	Yes
Washing machines achieve a minimum Energy Rating of 1 star below the maximum available rating	Yes
Clothes dryers achieve a minimum Energy Rating of 1 star below the maximum available rating	Yes
Dishwashers achieve a minimum Energy Rating of 1 star below the maximum available rating	Yes
15B.2.5 Fuel Switching	
No fossil fuels are burned on site to generate electricity, heating, or cooling	No
At least 15% of energy required by the building annually is generated by on site renewable solutions; or	No
Three points have been achieved from 15B.1	No
Is there a minor amount of fossil fuel (less than 1%) used on site for purposes where it can be demonstrated that there are no commercial alternatives (e.g. cooking or emergency generators).	No
Have Renewable Energy Certificates equal to these emissions been purchased and retired to offset the minor amount of fossil fuels used on the site? **(If there are no minor amounts of fossil fuel (less than 1%) used on site as per above,**	No

15B.2.6 On-site Storage	
A renewable energy storage procurement and use strategy has been developed and demonstrates that the storage is sized to match the requirements of the building and that value will be provided to the project	No
The stored renewable energy is used to reduce the peak electricity demand;	No
A project installs and uses electricity storage such that on-site or off-site renewable energy not instantaneously used by the building is able to be stored and used by the building at a later time	No
15B.2.7 Vertical Transportation	
The minimum lift energy efficiency is class A or B in accordance with ISO 25745-2;	No
The lift idle and standby energy performance level is 1 in accordance with ISO 25745-2	No
The minimum escalator energy performance is class A+ to A+++ in accordance with ISO 25745-3.	NA
15B.2.8 Passive Laundry Facilities	
95% of all dwellings have been provided with external drying balconies; or	No
95% of all units contain an internal, or external clothesline or hoists as follows: 1.) 4m total line length minimum for studios,1 and 2 bedroom units and; 2.) 6 m total line length minimum for 3 or more bedroom units.;	No
15B.2.9 Unoccupied Areas	
Common Areas	
95% of the net floor area of the common lobbies meet the requirements of 'Provision of Outdoor Air' criterion (9.2C); and	No
The openable size of windows must be 5% or more of the net floor area on a floor by floor basis	
Enclosed Car Parking	
Vehicle exhaust criterion of the *'Exhausting the Pollutants Directly to the Outside'* criterion (9.3C) has been achieved through natural ventilation ***(Where enclosed car parking is not provided, this requirement is considered 'not applicable please select NA)***	No
15B.2.10 Off-site Renewables	
Off-site Renewable electricity percentage as stipulated within the building's power supply contract	
Length of Off-site Renewables electricity contract period (in years)	

15B CREDIT SCORE	
15B.0 Conditional Requirement	**Conditional Requirement Met**
15B.1 Thermal and Energy Performance	1
15B.2.1 Lighting	1
15B.2.2 Ventilation and Air Conditioning	2
15B.2.3 Domestic Hot Water	1
15B.2.4 Appliances and Equipment	1
15B.2.5 Fuel Switching	0
15B.2.6 On-site Storage	0
15B.2.7 Vertical Transportation	0
15B.2.8 Passive Laundry Facilities	0
15B.2.9 Unoccupied Areas	0
15B.2.10 Off-site Renewables	0
TOTAL POINTS ACHIEVED	**5.8**
TOTAL POINTS AVAILABLE	**16**

Green Star Design & As Built

Greenhouse Gas Emissions Calculator

greenstar

User Input Cells

This calculator addresses criterion '15E GHG Emissions Reduction - Modelled Performance Pathway' and '16B Modelled Performance Pathway: Reference Building.'

15E Reference Building Pathway

15E.0 Conditional Requirement	
Targeted Green Star Rating	4 Star

Project input	
Select the location of the project for the correct GHG Emission Intensity Factors	VIC
Using District Services	No

GHG Emission Intensity Factors		Units
Grid Electricity	1.1700	kgCO2e/kWh
Natural Gas	0.0555	kgCO2e/MJ
LPG	0.0642	kgCO2e/MJ
Diesel	0.0748	kgCO2e/MJ
Coal	0.0932	kgCO2e/MJ
Biomass	0.0018	kgCO2e/MJ
Liquid Biofuels	0.0003	kgCO2e/MJ
District CHV	0.0542	kgCO2e/MJ
District HHV	0.0736	kgCO2e/MJ
District DHV	0.0736	kgCO2e/MJ
District Electricity (inc Off-site Renewables)	1.1700	kgCO2e/kWh

District Energy Systems		Units	Contract		Building	
Contract emission rate: CHV		kgCO2e/MJ	TPPA term		Building capacity	
Contract emission rate: HHV		kgCO2e/MJ	TPPA term		Building capacity	
Contract emission rate: DHV		kgCO2e/MJ	TPPA term		Building capacity	
Contract emission rate: District Electricity		kgCO2e/kWh	PPA term			

	REFERENCE BUILDING			INTERMEDIATE BUILDING		PROPOSED BUILDING			Improvement	Comments
	Source	Annual Energy Consumption	GHG Emissions	Annual Energy Consumption	GHG Emissions	Source	Annual Energy Consumption	GHG Emissions		
HVAC										
Heating	Grid Electricity	35500	41,535	33725	39,458	Grid Electricity	30175	35,305	15%	
Heating										
Cooling	Grid Electricity	35500	41,535	33725	39,458	Grid Electricity	30175	35,305	15%	
Cooling										
Heat Rejection										
Air Conditioning Fans										
Mechanical Ventilation Fans										
Pumps										
Services										
Domestic Hot Water	Grid Electricity	16700	19,539	16700	19,539	Grid Electricity	4790	5,604	71%	
DHW Circulators and Controls				0						
DCW Pumps and Controls				0						
Lifts	Grid Electricity	26800	31,356	26800	31,356	Grid Electricity	26800	31,356	0%	
Artificial Lighting - Internal	Grid Electricity	110100	128,817	110100	128,817	Grid Electricity	99090	115,935	10%	
Artificial Lighting - External				0						
Appliances (Class 2 only)				0						
Swimming Pools				0						
<Other 1 - user to specify>				0						
<Other 2 - user to specify>				0						
<Other 3 - user to specify>				0						
<Other 4 - user to specify>				0						
<Other 5 - user to specify>				0						
TOTALS		**808,560**	**262,782**	**795,780**	**258,629**		**687,708**	**223,505**		

Renewable Energy			
Photovoltaic			
Wind Turbines			
Co/Trigeneration			
Fuel Input			
Electricity Output			
External Energy Services			
On-site Shared renewable services			

Subtotal GHG Emissions	REFERENCE BUILDING		INTERMEDIATE BUILDING		PROPOSED BUILDING		
	Annual Energy Consumption (MJ)	GHG Emissions (kgCO2e/annum)	Annual Energy Consumption (MJ)	GHG Emissions (kgCO2e/annum)	Annual Energy Consumption (MJ)	GHG Emissions (kgCO2e/annum)	GHG Emissions (excl offsite supply)
Grid Electricity	224600	262782.0	221050	258628.5	191030	223505.1	223505.1
Natural Gas	0	0.0	0	0	0	0.0	0.0
LPG	0	0.0	0	0	0	0.0	0.0
Diesel	0	0.0	0	0	0	0.0	0.0
Coal	0	0.0	0	0	0	0.0	0.0
Biomass	0	0.0	0	0	0	0.0	0.0
Liquid Biofuels	0	0.0	0	0	0	0.0	0.0
District CHV	0	0.0	0	0	0	0.0	0.0
District HHV	0	0.0	0	0	0	0.0	0.0
District DHV	0	0.0	0	0	0	0.0	0.0
District Electricity (inc Off-site Renewables)	0	0.0	0	0	0	0.0	0.0
TOTAL	**808560**	**262782**	**795780**	**258628.5**	**687708**	**223505**	**223505**
TOTAL RENEWABLE					**0**	**0**	

Peak Electricity Demand Reduction	Reference Building		Proposed Building		Improvement	Day of Peak Demand
Peak Demand (kW)	Grid Electricity		Grid Electricity			

RESULTS	
15E.0 Conditional Requirement	**Conditional Requirement Met**

15E.1 GHG Emissions Reduction: Building Fabric		
Reference Building Energy	808,560	MJ/annum
Intermediate Building Energy	795,780	MJ/annum
Improvement	1.6%	
GHG Emissions Reduction: Building Fabric	**0.8**	

15E.2 Greenhouse Gas Emissions Reduction		
Benchmark Building GHG	236503.8	kgCO2e/annum
Proposed Building GHG (excluding off-site supply)	223505.1	kgCO2e/annum
Proposed Building GHG with District services	223505.1	kgCO2e/annum
Improvement %	5.5%	
Conditional Requirement	PASS	
GHG Emissions Reduction Points achieved through building energy efficiency	**2.8**	

15E.3 Off-site Renewables	
Off-site Renewable electricity percentage as stipulated within the building's power supply contract	
Length of Off-site Renewables electricity contract period (in years)	
Points achieved through Off-Site Renewables	**0.0**

15E.4 District Services	
Overall GHG Emissions Reduction Points through District Services	5%
Maximum reduction % improvement that can be claimed through District Services	0%
GHG Emissions Reduction Points achieved through District Services	**0.0**

15E.5 Additional Prescriptive Measures	
15E.5.1 Transition Plan	
Has there been a transition plan developed showing how the building will transition away from the use of fossil fuels by 2030 and;	No
The commitment to this transition by 2030 is public and	No
Transition plan has been integrated into the design and operation of the building	No
15E.5.2 Fuel Switching	
No fossil fuels are burned on site to generate electricity, heating, or cooling	No
Is there a minor amount of fossil fuel (less than 1%) used on site for purposes where it can be demonstrated that there are no commercial alternatives (e.g. cooking or emergency generators).	No
Have Renewable Energy Certificates equal to these emissions been purchased and retired to offset the minor amount of fossil fuels used on the site? **(If there are no minor amounts of fossil fuel (less than 1%) used on site as per above, please select NA here)**	No
15E.5.3 On-site Storage	
A renewable energy storage procurement and use strategy has been developed and demonstrates that the storage is sized to match the requirements of the building and that value will be provided to the project; and	No
The stored renewable energy is used to reduce the peak electricity demand; and	No
A project installs and uses electricity storage such that on-site or off-site renewable energy not instantaneously used by the building is able to be stored and used by the building at a later time	No

30A-Innovative Technology or Process - On-site Renewable Energy	
Renewable Energy Contribution (including shared renewable services)	0%
Innovation points - Renewable Energy	**0**

15E.5 Additional Prescriptive Measures	
15E.5.1 Transition Plan	
Has there been a transition plan developed showing how the building will transition away from the use of fossil fuels by 2030 and;	No
The commitment to this transition by 2030 is public and	No
Transition plan has been integrated into the design and operation of the building	No
15E.5.2 Fuel Switching	
No fossil fuels are burned on site to generate electricity, heating, or cooling	No
Is there a minor amount of fossil fuel (less than 1%) used on site for purposes where it can be demonstrated that there are no commercial alternatives (e.g. cooking or emergency generators).	No
Have Renewable Energy Certificates equal to these emissions been purchased and retired to offset the minor amount of fossil fuels used on the site? **(If there are no minor amounts of fossil fuel (less than 1%) used on site as per above, please select NA here)**	No
15E.5.3 On-site Storage	
A renewable energy storage procurement and use strategy has been developed and demonstrates that the storage is sized to match the requirements of the building and that value will be provided to the project; and	No
The stored renewable energy is used to reduce the peak electricity demand; and	No
A project installs and uses electricity storage such that on-site or off-site renewable energy not instantaneously used by the building is able to be stored and used by the building at a later time	No

30A-Innovative Technology or Process - On-site Renewable Energy	
Renewable Energy Contribution (including shared renewable services)	0%
Innovation points - Renewable Energy	**0**

CREDIT SCORE	
15E.0 Conditional Requirement	**Conditional Requirement Met**
15E.1 GHG Emissions Reduction: Building Fabric	0.8
15E.2 Greenhouse Gas Emissions Reduction	2.8
15E.3 Off-site Renewables	0.0
15E.4 District Services	0.0
15E.5.1 Transition Plan	0
15E.5.2 Fuel Switching	0
15E.5.3 On-site Storage	0
TOTAL POINTS ACHIEVED	**3.6**
TOTAL POINTS AVAILABLE	**20**
Innovation Points Achieved	**0.0**

16B PEAK ELECTRICITY DEMAND REDUCTION

Results

Peak electricity demand reduction		
	Total Points Achieved	**0.0**
	Total Points Available	**2.0**

Green Star Design & As Built

Greenhouse Gas Emissions Calculator

greenstar Developed by the Green Building Council of Australia

User Input Cells

Multiple Pathways Calculator

1 Fill out each individual tab that represents the composition of your project.

2 Then, allocate the Gross Floor Area of each NCC Class type that are included in your Green Star project and area-weighted points will be calculated.

	Gross Floor Area (m²)	Energy/GHG Reduction			Peak Demand Reduction		
		Maximum Points	Achieved Points	Area-Weighted Points	Maximum Points	Achieved Points	Area-Weighted Points
15A Prescriptive Path	0	10	Conditional Rec	ERROR	1	0	0
15B NatHERS Path	8614	16	5.8	3.5	1	0	0
15C BASIX Path	0	16	0.0	0.0	1	0	0
15D NABERS Energy Path	0	20	not met for the t	ERROR	1	0	0
15E Reference Path	5629	20	3.6	1.4	2	0	0
TOTAL	**14243**			**5**			**0**

Targeted Green Star Rating - Please enter the targeted Green Star Rating of the project.	4 Star
15.0 Conditional Requirement for Minimum points threshold	Conditional Requirement Met

Appendix 3 – Green Star Design & As Built v1.3 Potable Water Calculator

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

				Weighted Points Achieved	3.6	
Links to - Building and climate data:	Building input, areas and operation	10-year rainfall data				
Links to - Water demand:	Fittings	Whitegoods	Heat Rejection	Washdown	Landscape Irrigation	
	Swimming pools	Fire Protection System	Process Cooling			
Links to - Reclaimed water supply:	Reclaimed water use	Rainwater collection	Greywater collection	Blackwater collection	Stormwater and off-site reclaimed water	
Links to - Results:	Checklist	Demand summary	Results for Performance Pathway (18A) only	Results for Domestic hot water	Results for Sewerage	
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.			

0. 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: Proposed Building design occupancy (m2/person)	Maximum design occupancy used in water use: Default design occupancy (Not applicable for residential areas)	Percentage of building users who occupy the space continually for periods greater than one hour
Apartments	8735	7 days a week	Class 1, 2 or 3 Residential	46	Please select	100%
Office	5076	5 days a week	NCC Table 2c & 2d (Class 5, Class 7 Class 8 or Class	10	Office (10m2/person)	100%
Lounge/Reception/Coworking	185	7 days a week	NCC Table 2f (Class 6 restaurant or cafe)	2	Please select	50%
Gym	100	7 days a week	NCC Table 2h (Class 9b theatre or cinema)	3	Please select	50%
Retail/Food and beverage	551	7 days a week	NCC Table 2e (Class 6 shop or shopping centre)	5	Retail / Showroom (5m2/person)	25%
		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	14647					

BUILDING 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?	Yes
Have showers been installed for post/pre activity use?	Yes
2. White Goods	
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 cooling towers?	No
4. Wash Down	
Does the project include wash down areas?	No
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 System	
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. Water Reclamation	
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

1. SANITATION FIXTURE EFFICENCY

WATER DEMAND FROM 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. Please see pages 10-13 of the Green Star - Potable Water Calculator Guide for further details.)

	Water efficiency: Manual entry from manufacturer's data sheet (l/min, or L/flush for toilets)	Water efficiency: WELS Star Rating selection	Resulting water efficiency used in calculator (l/min, except for toilets, L/flush)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)	
Toilets							
Toilets		4 Star	3.5	100%			
<enter description here>		Select star rating					
<enter description here>		Select star rating					
<enter description here>		Select star rating					
			Total	100%	1468.0	1677.8	(The Standard Practice Benchmark is based on 3 Star WELS rated toilets)
	Are urinals installed?	No	**Would urinals normally be installed**	No	(Note: if "No" is selected, the project team should provide justification within the short report as to why the		
Urinals							
Urinals		6 Star	1	100%			
<enter description here>		Select star rating					
<enter description here>		Select star rating					
<enter description here>		Select star rating					
Urinals on auto timer	**Enter average L/flush**						
	Enter number of urinals on autotimer						
	Percentage of total number of Urinals						
			Total	100%	0.0	0.0	(The Standard Practice Benchmark is based on 3 Star WELS rated urinals)
Indoor taps							
Taps in kitchens and bathrooms		6 Star	4.5	100%			
<enter description>		Select star rating					
<enter description>		Select star rating					
<enter description>		Select star rating					
			Total	100%	307.7	512.9	(The Standard Practice Benchmark is based on 4 Star WELS rated taps)

Star WELS rated taps)

	Shower demand by occupants (reference)		100.0%		For residential building: Enter 100% for both "reference" and "current" shower demand	
Showers - Occupants	**Shower demand by occupants (current)**		100.0%		For other building Types: Use the reference and prepared building bicycle accommodation percentage from the Sustainable Transport Calculator, as percentage determined under 17.B.4 'Active Transport Facilities' criterion to determine the number of building occupants that are likely to shower each day.	
Showerheads	6	3 Star	6	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
		Total	100%		5234.2	7851.4

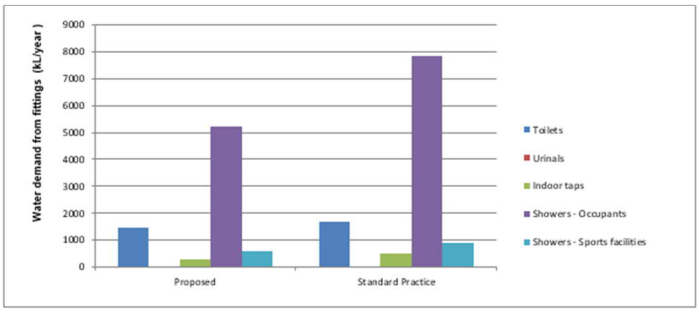
(The Standard Practice Benchmark is based on 3 Star WELS rated showers)

	Indicate the number of people expected to participate in sporting activities each day. (Use an average based on weekly figures if required)		**55**	Indicate the number of days/year that the sports facilities are in use	**365**	
Showers - Sports facilities						
Showerheads	6	3 Star	6	100%		
<enter description>		Select star rating				
<enter description>		Select star rating				
<enter description>		Select star rating				
		Total	100%		602.3	903.4

(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	1468.0	1677.8
Urinals	0.0	0.0
Indoor taps	307.7	512.9
Showers - Occupants	5234.2	7851.4
Showers - Sports facilities	602.3	903.4
TOTAL	7612.3	10945.4



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

	Water efficiency								
Clothes washing machines	**Manual entry from manufacturer's data**	**WELS Star Rating selection**	**Machine capacity (kg)**	**Resulting water efficiency used in calculator (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)**
<enter description>		3.5 Star	7	12.3	82			2,576.7	3079.8
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
				Total	82			2576.74	3079.8

Water Demand from Dishwashers

	Water efficiency								
Dishwashers	**Manual entry from manufacturer's data**	**WELS Star Rating selection**	**Machine capacity (number of place settings)**	**Resulting water efficiency used in calculator (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)**
<enter description>		4 Star		14	82			42.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
<enter description>		Select star rating						0.0	0.0
				Total	82			42.02	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	**Monthly rainfall (mm)**	**Monthly evapotranspiration (point potential) (mm)**
January	33.6	240
February	50.2	210
March	26.3	180
April	50.0	120
May	39.3	60
June	40.9	60
July	36.3	60
August	45.1	90
September	41.6	120
October	55.2	150
November	50.2	180
December	63.0	210

Data on each landscaped zone				**Irrigation system water application efficiency**	
Zone name and description	**Area of zone (m²)**	**Percentage of zone undercover (%)**	**Weighted average crop coefficient in zone**	**Default water application efficiency for common irrigation**	**User determined application efficiency**
Planters	100	0%	0.6	Drip - Bare soil (80%)	
				Please select	
				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

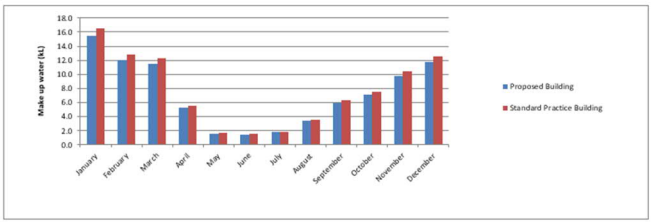
Annual irrigation requirement from each zone

Zone name and description	Annual irrigation requirement for each zone (kL/year)	
	Proposed Building	Standard Practice Building
Planters	86.9	92.7
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
0	0.0	0.0
0	0.0	0.0
0	0.0	0.0
TOTAL for all zones (kL/year)	**86.9**	**92.7**

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.

Total irrigation requirement for all zones by month

	Irrigation requirement for all zones per month (kL/month)	
	Proposed Building	Standard Practice Building
January	15.5	16.5
February	12.0	12.8
March	11.5	12.3
April	5.3	5.6
May	1.5	1.7
June	1.4	1.5
July	1.8	1.9
August	3.4	3.6
September	5.9	6.3
October	7.1	7.6
November	9.7	10.4
December	11.8	12.6
Total make up water (kL/year)	**86.9**	**92.7**



9. RECLAIMED WATER

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

Reclaimed Water Use

How are the water demands from uses assessed in Potable Water credit met?

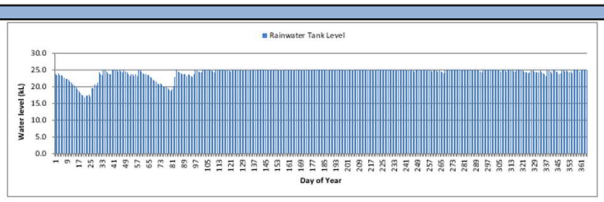
Water use (assessed in Potable Water, Credit 18)	Percentage of fittings/systems connected to the following water sources				
	Rainwater	Greywater	Blackwater	Stormwater recycling or other off-site reclaimed water	Mains water only (this column must be completed - please enter a figure of between 0% and 100% for each water use)
Toilets	7%				93%
Urinals					
Indoor Taps					
Showers - occupants					
Showers - sports					
Laundries					
Dishwashers					
Heat rejection					
Wash down					
Landscape irrigation	100%				
Fire system water					
Swimming pools					
Process cooling					

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.

Note: 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.

Rainwater Collection

Rainfall collection area (m2)		927
Run-off co-efficient	Flat roof without gravel	0.8
Storage capacity (kL)		25
Rainwater tank reliability %		50%

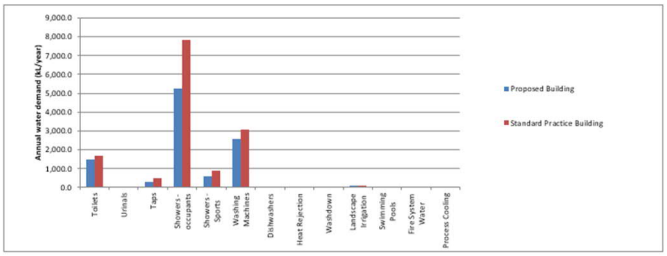


9. SUMMARY OF WATER DEMAND

Summary of demand from each Potable water use

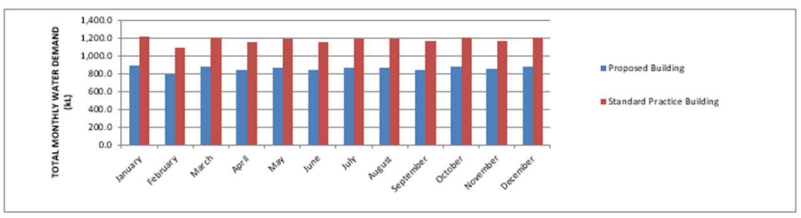
Annual water demand from each Potable water use (kL/year)

	Proposed Building	Standard Practice Building
Toilets	1,468.0	1,677.8
Urinals	0.0	0.0
Taps	307.7	512.9
Showers - occupants	5,234.2	7,851.4
Showers - Sports	602.2	903.4
Washing Machines	2,576.7	3,079.8
Dishwashers	42.0	0.0
Heat Rejection	0.0	0.0
Washdown	0.0	0.0
Landscape Irrigation	86.9	92.7
Swimming Pools	0.0	0.0
Fire System Water	0.0	0.0
Process Cooling	0.0	0.0
TOTAL	10,317.9	14,117.9



Summary of demand from all Potable water uses per month

	Monthly water demand from all Potable water uses (kL/month)	
	Proposed Building	Standard Practice Building
January	889.4	1,213.6
February	801.0	1,093.7
March	884.8	1,208.8
April	849.5	1,162.5
May	873.4	1,196.5
June	845.1	1,157.8
July	873.6	1,196.8
August	875.5	1,198.8
September	850.2	1,163.3
October	879.8	1,203.3
November	854.7	1,168.0
December	885.1	1,209.1
TOTAL	10,362.0	14,172.2



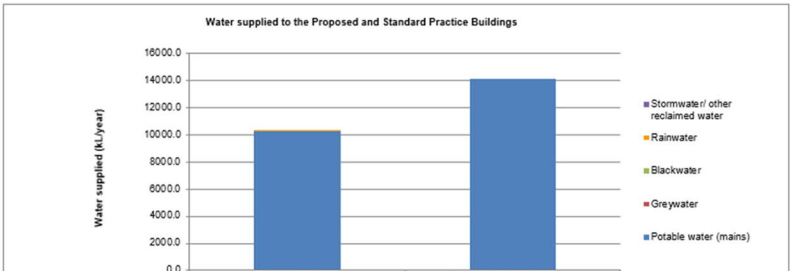
10. RESULTS

	Proposed Building						Standard Practice Building
	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	884	16	0	0	0	868	1,208
February	797	13	0	0	0	784	1,089
March	880	12	0	0	0	868	1,203
April	846	6	0	0	0	840	1,158
May	870	2	0	0	0	868	1,193
June	842	2	0	0	0	840	1,154
July	871	2	0	0	0	868	1,193
August	872	4	0	0	0	868	1,195
September	847	6	0	0	0	840	1,159
October	876	8	0	0	0	868	1,199
November	851	10	0	0	0	840	1,163
December	881	12	0	0	0	868	1,204
TOTAL	10,318	94	0	0	0	10,224	14,118

Percentage reduction in Potable Water Consumption compared to the Standard Practice	28%

Points Achieved - General	3.6
Points Achieved - Fire system test water	0
Points Achieved - Process cooling	N/A

Points Allocation		
Percentage reduction compared to standard practice benchmark	kL/year	Points awarded
0%	14118	0.0
5%	13412	1.1
15%	12000	2.2
25%	10588	3.3
35%	9177	4.4
45%	7765	5.5
55%	6353	6.6
65%	4941	7.7
75%	3529	8.8
85%	2118	9.9
95%	706	11.0



	Proposed Building	Standard Practice Building
Stormwater/ other reclaimed water	0.0	0.0
Rainwater	94.1	0.0
Blackwater	0.0	0.0
Greywater	0.0	0.0
Potable water (mains)	10223.8	14117.9

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.

	Proposed Building	Standard Practice Building
Annual Domestic Hot Water Usage (kL/year)	3072.12	4633.82

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.

Appendix 4 – Green Star VOC and Formaldehyde Emissions Limits

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

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

Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 Manual)

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

Appendix 5 – 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 off the impervious surfaces into the stormwater drains.

The City of Port Phillip has recognised the importance of stormwater management and the effects on the surrounding environment. As a result, a local planning policy, Clause 22.12 *Stormwater Management (Water Sensitive Urban Design)*," has been introduced into the Port Phillip Planning Scheme. New developments, or extensions to existing buildings which are 50m^2 in floor area or greater, must adhere to the local policy.

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

- To achieve the best practice water quality performance objectives set out in the *Urban Stormwater Best Practice Environmental Management Guidelines*, CSIRO 1999 (or as amended). Currently, these water quality performance objectives are:
    - 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; and
    - Litter - 70% reduction of typical urban annual load.
- To promote the use of water sensitive urban design, including stormwater re-use.
- To mitigate the detrimental effect of development on downstream waterways, by the application of best practice stormwater management through water sensitive urban design for new development.
- To minimise peak stormwater flows and stormwater pollutants to improve the health of water bodies, including creeks, rivers and bays.
- To reintegrate urban water into the landscape to facilitate a range of benefits including microclimate cooling, local habitat and provision of attractive spaces for community use and well-being.

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 modelling software – which is an industry accepted tool – was used to determine the treatment effectiveness of these initiatives.

Site Characteristics

For the purposes of the STORM assessment, the site has been delineated into basic surface types listed below:

- Total site area – 1,543m^2;
- Roof catchment area (blue) – 910m^2;
- Remaining site (including Level 5 terrace, planter boxes) (red) – 633m^2.

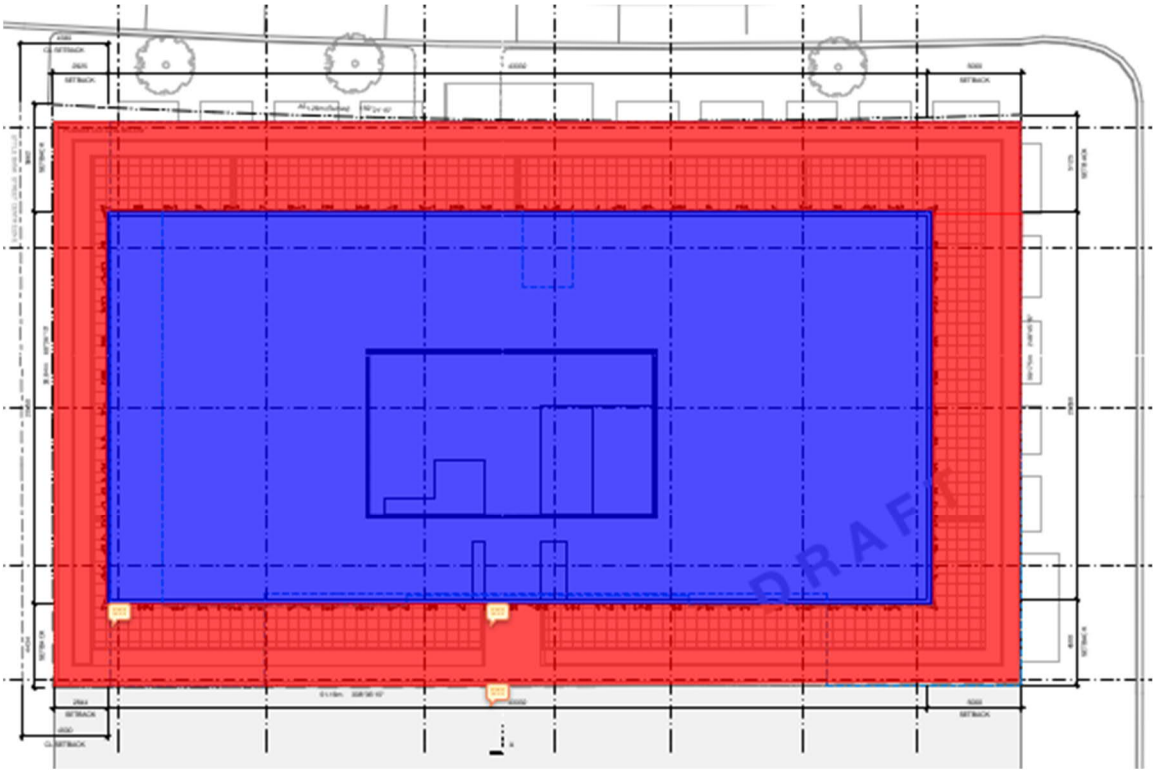


Figure 4: Site delineation

Stormwater Management Initiatives

Stormwater treatment initiatives are required to achieve compliance. 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 development and its ability to meet stormwater management objectives.

Table 1: List of areas and their stormwater treatment measures

Surfaces	Topographic Area (m^2)	Required Treatment
Roof catchment	910m^2	The entire Level 17 top roof will be designed to capture rainwater runoff to be stored in a tank(s) with a minimum effective capacity of 25,000L. The proposed location of the tank(s) is below ground at basement level. The rainwater will be connected for toilet flushing to the podium office spaces. The stored water will also be utilised for on-site irrigation of planters. Overflow from the tank(s) will then be directed to the legal point of discharge (LPD).
Remaining site	633m^2	The remaining runoff from impervious areas will be diverted directly to the LPD onsite.

Daily Demand

The equivalent occupancy of the amenities to which rainwater will be connected for toilet flushing can be calculated as follows.[4]

$$Hours_{person/day} = \frac{Area}{Maximum\ Occupancy} \times Hours_{equivalent\ at\ \max occupancy/\ day}$$

Amenity	Area (m^2)	Maximum Occupancy (m^2/person)	Equivalent hours at maximum occupancy per day	Percentage of users who occupy the space continually for periods greater than one hour
Office – Level 1-4	5,076	10	6.8	100%

When multiplied by the percentage of users who are likely to make use of toilet facilities, the number of uses per per person-hour (0.24)[5], and the specified water use of the toilets to be installed, the total toilet water use of these amenities can be calculated to be 828L per day.

The 100m^2 of planters will require daily irrigation of around 110L[6].

[4] Based on the Green Star Potable Water Calculator Guide, September 2019, section 3.1
[5] Green Star Potable Water Calculator Guide, September 2019, Table 3
[6] Based on 350mm irrigation requirement

STORM Assessment Results

The impervious surfaces and recommended treatments have been applied to the STORM tool and as a result, the proposed development has achieved a score of 100%. With the proposed stormwater treatment measures incorporated into the development at 200 Wells Street the design will meet the minimum performance standards required by the City of Port Phillip.

Melbourne Water **STORM Rating Report**

TransactionID:	1139293
Municipality:	PORT PHILLIP
Rainfall Station:	PORT PHILLIP
Address:	200 Wells Street
	South Melbourne
	VIC 3205
Assessor:	Sustainable Development Consultants
Development Type:	Residential - Mixed Use
Allotment Site (m2):	1,543.00
STORM Rating %:	100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof - Diverted to RWT	910.00	Rainwater Tank	25,000.00	100	170.00	81.00
Impervious Area	633.00	None	0.00	0	0.00	0.00

Figure 5: STORM assessment result

Appendix 6 – FirstRate 5 Sample Energy Rating Report

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

The Wells Street development is located in Climate Zone 21 (Melbourne) and is required by the BCA (National Construction Code) to achieve an average rating of 6.0 Stars, with no apartment rating less than 5 Stars; however, the Green Star credit 15B being targeted requires no apartment rating less than 5.5 Stars. Additionally, a cooling load of $\leq$30MJ/m^2 is required as set out in Clause 58.03-1 Standard D6 Table D1 of the Port Phillip Planning Scheme.

The following are the scores achieved by the sample apartments in the development:

Sample Apartment	Star Rating	Energy Use (MJ/m^2)	Heating Load (MJ/m^2)	Cooling Load (MJ/m^2)	Similar Apartments	No. of Similar Apartments
6.04	7.8	57.3	44.3	13.0	-	1
6.05	7.9	55.6	33.0	22.6	-	1
6.06	7.7	63.7	40.8	22.9	-	1
11.01	6.1	110.1	80.4	29.7	5F, 7F-15F	10
11.02	8.1	50.8	27.1	23.7	5F, 7F-15F	10
11.03	7.2	75.7	54.0	21.7	7F-15F	9
11.04	7.2	75.8	54.1	21.7	5F, 7F-15F	10
11.05	7.5	67.9	47.9	20.0	5F, 7F-15F	10
11.06	7.3	74.7	59.6	15.1	5F, 7F-15F	10
11.07	5.9	118.4	90.0	28.4	5F ,7F-15F	11
17.01	6.4	99.6	74.0	25.6	16F-17F	2
17.02	6.3	105.5	78.2	27.3	16F-17F	2
17.03	6.2	107.0	77.5	29.5	16F-17F	2
17.04	6.1	111.9	86.5	25.4	16F-17F	2
WEIGHTED AVERAGE	**7.0**					

The above has been achieved with the building elements as per the specifications outlined below.

<table>
<tr><th>Proposed Specification</th><th>Proposed Specifications</th></tr>
<tr><td>External Walls</td><td>All external walls modelled as external light weight cladding (fibre cement) and spandrel panel.
All external walls require R2.5 insulation.</td></tr>
<tr><td>Partition Walls</td><td>Party walls between apartments and corridors require R2.0 insulation.
Concrete party walls between apartments and stair/lift core require R2.0 insulation.
Double stud party walls between apartments require R2.0 insulation to each side (R4.0 total).</td></tr>
<tr><td>Internal Walls</td><td>Single stud walls no insulation required.</td></tr>
<tr><td>Glazing</td><td>All external glazing has been modelled as 2000mm high at a 2700mm head height (excl. sliding and hinged doors.) The wall directly below glazing has been modelled as spandrel panel.
All windows on are required to have the following performance values:
<table>
<tr><th>Window Type</th><th>U value</th><th>SHGC</th></tr>
<tr><td>Awning</td><td>4.1</td><td>0.41</td></tr>
<tr><td>Fixed</td><td>3.08</td><td>0.59</td></tr>
<tr><td>Sliding door</td><td>3.19</td><td>0.48</td></tr>
<tr><td>Hinged door</td><td>3.8</td><td>0.44</td></tr>
</table>
These values are commonly found in Capral window systems with aluminium frames and double glazed energy advantage glass.
The window systems to be installed are required to have a U-value equal or less than the U-values stated above and the window systems SHGC values to have an SHGC value that is ± 5% of the above values. Any window system can be used as long as they fit within these requirements.</td></tr>
<tr><td>External Shading</td><td>External shading as per plans, no changes proposed. Overhangs used for input, as well as incidental shading provided by the building.</td></tr>
<tr><td>Roof/Ceiling</td><td>Roof modelled as concrete slab.
Additional R2.5 insulation required to ceilings below balcony.
Additional R5.0 insulation required to the roof areas of Level 17 apartments.</td></tr>
<tr><td>Floors</td><td>Suspended slabs modelled as 200mm thick.
Additional R2.5 insulation required to suspended slab floors elevated above open or unconditioned space.</td></tr>
<tr><td>Floor Coverings</td><td>Floating timber to kitchens, carpet to bedrooms and tiles to all wet areas.</td></tr>
</table>

Proposed Specification	Proposed Specifications
Down Lights	All recessed down light fittings that have openings allowing air to pass through to a ceiling cavity (e.g. Adjustable down lights) shall be fitted with a cover that allows for ceiling insulation to closely enclose the sides and top of the down light.
Exhaust Fans	All exhaust fans are to incorporate self-closing louvers or dampers that seal shut when not in use
Window and Door Sealing.	All external windows and doors shall be sealed to minimise air infiltration and all gaps and cracks are to be appropriately sealed through use of caulking, skirting and architraves.

The above building elements may vary as the plans are refined for building approval; however, the overall building energy rating performance will not be less than 7.0 Stars (average) for the development.