

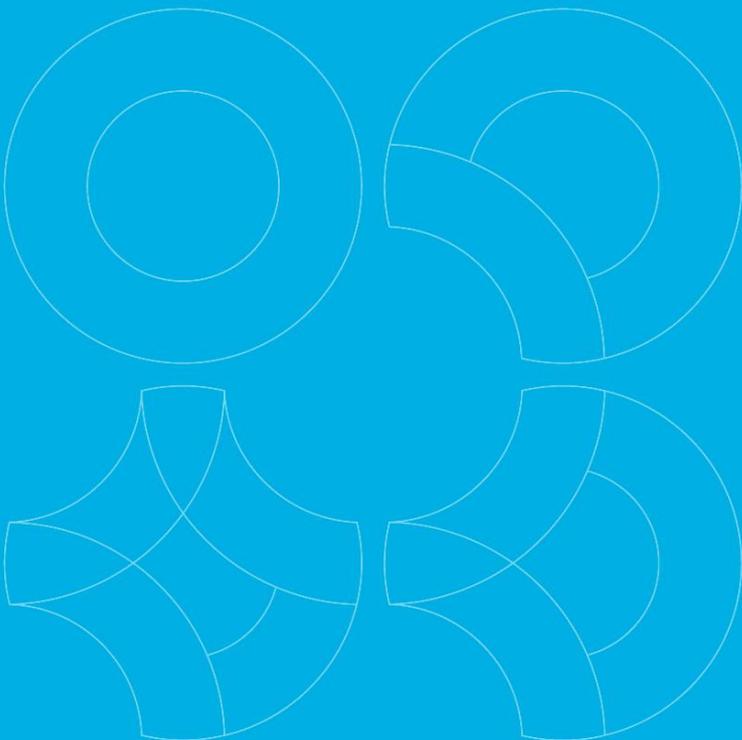
# Sustainable Management Plan

## Site 1 264-270 Normanby Road South Melbourne

Prepared by  
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15 November 2019  
Revision F  
Project No. 20604



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Revision	Date	Description	Author
P1	26/03/2015	Preliminary Issue for Client and Design Team Review	CV
A	16/06/2015	Issue Incorporating Architect Comments	ST
B	24/06/2015	Issue for Planning	ST
C	30/04/2019	Updated Design for Planning	PC
D	22/07/2019	Revised Design: Appendix B Updated	PC
E	12/08/2019	Revised Design: Appendix B Updated	PC
F	15/11/2019	Updated in response to RFI	EP/PC

## 1 Introduction

This report has been prepared to review the sustainable design initiatives to be included within the proposed development at 264-270 Normanby Road, South Melbourne, which is within the Fishermans Bend Urban Renewal Area. This report will review sustainable design based on the following methodology:

### ESD Initiatives

- As required by the National Construction Code (NCC)
- As required by the City of Port Phillip

The proposed precinct is a mixed used development as follows:

- Basement Level - carpark, services, storage
- Ground Level – main lobby, commercial lobby, retail space, services
- Upper Ground – carpark, storage
- Levels 1-3 – carpark, commercial space
- Level 4 – apartments, amenities (gym, family lounge, conference room)
- Levels 5-19 – apartments

In total the project consists of:

- 158 Apartments (1, 2 and 3 bedrooms)
- 2437m<sup>2</sup> NLA Commercial
- 882m<sup>2</sup> NLA Retail
- 101 Car parking spaces

This report will focus on improving the environmental performance of the complete development.

The project is mixed use and, as per the policy, shall be assessed against the performance measures applicable to each component and use of the development.

## 2 Town Planning Requirements

The proposed project is within City of Port Phillip and to demonstrate environmental best practice for a project of this size a Sustainable Management Plan (SMP) has been prepared (this document).

### Port Phillip Planning Scheme: Environmentally Sustainable Development

The objective of section 22.13 of the Port Phillip Planning Scheme is for the development to achieve best practice in environmentally sustainable development from the design stage through to construction and operation.

The objectives of energy performance, water resources, indoor environment quality, stormwater management, transport, waste management and urban ecology should be satisfied where applicable.

For a development with a residential component comprising 10 or more dwellings, and non-residential component with a gross floor area of more than 1000m<sup>2</sup>, the objectives of the policy are required to be addressed within a Sustainability Management Plan.

Example assessment tools provided in the policy to address section 22.13:

- Green Star
- Built Environment Sustainability Scorecard (BESS)
- MUSIC
- Melbourne Water STORM

### Port Phillip Planning Scheme: Fishermans Bend Urban Renewal Area Policy

Section 22.15 of the Port Phillip Planning Scheme applies to all land within Fishermans Bend affected by the Capital City Zone Schedule 1 or Design and Development Overlay Schedules 30, 32 and 33. Council have confirmed that this policy applies to this development site.

The intent of the policy is for Fishermans Bend to become a leading example of environmental sustainability, liveability, connectivity, diversity and innovation. Fishermans Bend is striving for a 6 Star Green Star Community rating.

Targets relevant to the ESD assessment are as follows:

- Achieving a climate adept, water sensitive, low carbon, low waste community through the consideration of:
  - Energy
    - 20% improvement on current National Construction Code energy efficiency standards
    - Residential developments should achieve an average 7 Star NatHERS rating for each building
    - Developments should incorporate renewable energy generation
  - Urban heat island
    - At least 70% of the total site area should comprise building or landscape elements that reduce the impact of the urban heat island effect (side note: the target is 75% in Green Star)
  - Sea level rise, flooding and water recycling and management
    - Integrate best practice Water Sensitive Urban Design
  - Waste Management
    - Optimise waste storage and efficient collection methods
    - Combine commercial and residential waste storage
    - Separate collection for recycling, hard waste, and food and green waste
  - Sustainable Transport: high levels of and easy access to bicycle parking facilities, alongside reduced car parking provisions

#### **Port Phillip Planning Scheme: Stormwater Management (Water Sensitive Urban Design)**

Section 22.12 of the Port Phillip Planning Scheme sets out planning application requirements relating to Water Sensitive Urban Design (WSUD). In general, the following is required:

- A site layout plan showing the location of proposed storm water treatment measures.
- A report outlining how the application achieves the objectives of the policy.
- Design Details.
- Site Management Plan detailing how the site will be managed through construction.
- Maintenance Program – future operational and maintenance arrangements.

#### **Port Phillip Planning Scheme: Schedule 1 to Clause 37.04 Capital City Zone (CCZ1)**

Schedule 1 of Clause 37.04, of the Port Phillip Planning Scheme, sets out additional planning application requirements for developments within the Fishermans Bend Urban Renewal Area. As per section 4.3, the following ESD items are required:

- Green Star rating:
  - For a building containing 10 or more dwellings, the project must be registered to seek a minimum 5-Star Green Star Design & As-Built rating with the Green Building Council of Australia, and
  - Within 12 months of occupation of the building, certification must be submitted demonstrating that the building has achieved a minimum 5-Star Green Star Design & As-Built rating by way of GBCA certification.
- Third pipe and rain tank
  - A third pipe must be installed for recycled and rainwater to supply all non-potable outlets within the development for toilet flushing, irrigation and washing machine unless otherwise agreed, and
  - An agreed building connection point must be provided from the third pipe, designed to the satisfaction of the relevant water supply authority, to ensure readiness to connect to a future precinct-scale recycled water supply, and
  - A rainwater tank must be provided that:
    - Has a minimum effective volume of 0.5m<sup>2</sup> for every 10m<sup>2</sup> of catchment area to capture rainwater from 100% of suitable roof rainwater harvesting areas (including podiums), and

- Is fitted with a first flush device, meter, tank discharge control and water treatment with associated power and telecommunications equipment approved by the relevant water authority.
- Rainwater captured from roof harvesting areas must be reused for toilet flushing, washing machine and irrigation or, controlled release.

Refer to the following sections of this report for the project response to the items noted above

### 3 Environmental Performance Assessment

#### 3.1 NATIONAL CONSTRUCTION CODE

The National Construction Code (NCC) 2016 Section J energy efficiency provisions will be applicable to this development as the mandatory minimum performance standard to be achieved.

#### 3.2 PORT PHILLIP PLANNING SCHEME

The preliminary design of the proposed development has the preliminary design potential to achieve a certified 5 Star Green Star rating based on the Green Star Design & As-Built tool v1.2, with 5 Stars representing “Australian Excellence” in green building design.

These performance measures will ensure that the development achieves the following:

- High environmental performance standards at the design, construction and operation phases.
- Reduction of the city's contribution to climate change impacts by reducing greenhouse gas emissions.
- Improved water efficiency and utilisation of alternative water sources.
- Reduced quantity of waste going to landfill and increased recycling and reuse of materials.
- Reduced impacts of waste on the community.

### 4 Stormwater Management & Water Sensitive Urban Design

The development aims to reduce the impact of stormwater runoff and to minimise environmental impacts in stormwater outcomes in accordance with Council's best practice guidelines and the objectives of the Port Phillip Planning Scheme as follows:

- To achieve the best practice water quality performance objectives set out in the *Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999*.
  - Suspended Solids – 80% reduction of typical urban annual load
  - Total Nitrogen – 45% reduction of typical urban annual load
  - Total Phosphorus – 45% reduction of typical urban annual load
  - 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 wellbeing.

The development is committed to implementing best practice water sensitive urban design (WSUD) principles by managing stormwater treatment onsite. This will be demonstrated by undertaking computer modelling with eWater MUSIC. It is noted that proprietary devices are not to be relied on, and as such, rainwater tanks with capability to provide the requisite level of water treatment are being sought.

#### 4.1 STORMWATER MANAGEMENT

The stormwater management system proposed includes the following elements:

- Surface rainwater harvested from all non-trafficable roof areas (1334.6m<sup>2</sup>) to drain to a minimum 96.1kL rainwater tank for reuse in toilet and urinal flushing.
- Surface rainwater harvested from all trafficable areas (688m<sup>2</sup>) to drain to a minimum 5kL rainwater tank for reuse in irrigation and bin washdown.
- Post development flow will match or be less than pre-development flow – this is the case since post-development, with the introduction of rainwater storage tanks, stormwater will be diverted from discharge and used for toilet and urinal flushing, bin washdown and landscape irrigation.
- Stormwater drainage carrying surface water will accommodate flows for a 5-year, 72 hour storm event.
- The rainwater tank and in-ground stormwater drainage considerably reduce the peak stormwater discharges from the development site compared to the existing site.
- The rainwater tanks will be fitted with a first flush device, meter, tank discharge control and water treatment with associated power and telecommunications equipment approved by the relevant water authority.

##### 4.1.1 Rainwater Re-use

Harvested rainwater will be used within the site for the following purposes:

- Toilet and urinal flushing across all levels
- Bin washdown
- Landscape irrigation

##### 4.1.2 Third Pipe

Third pipe connection to the site will supply all non-potable outlets within the development, as a back-up supply to the rainwater reuse tanks.

Recycled water will be used within the site for the following purposes:

- Washing machines across all levels
- Toilet and urinal flushing (back-up to rainwater reuse tank)
- Bin washdown (back-up to rainwater reuse tank)
- Landscape irrigation (back-up to rainwater reuse tank)

An agreed building connection point will be provided from the third pipe, designed to the satisfaction of the relevant water supply authority, to ensure readiness to connect to a future precinct-scale recycled water supply.

#### 4.2 WATER SENSITIVE URBAN DESIGN (WSUD)

The policy of water sensitive urban design and the project response to are summarised below:

##### 4.2.1 Response to Planning Scheme clause 22.12

- To achieve the best practice water quality performance objectives.
  - Project response: Stormwater reuse to achieve the following minimum reduction in typical urban load:
    - Suspended Solids – 80% reduction
    - Total Nitrogen – 45% reduction
    - Total Phosphorus – 60% reduction
    - Litter – 90% reduction
- To promote the use of water sensitive urban design, including stormwater re-use
  - Project response: Rainwater shall be collected, stored and re-used for toilet and urinal flushing, bin washdown and landscape irrigation across all levels.
- To mitigate the detrimental effect of development on downstream waterways.

- Project response: Stormwater treatment will be provided for stormwater overflow leaving the site to reduce litter and pollutants in the stormwater discharge.
- To minimise peak stormwater flows and stormwater pollutants.
  - Project response: The quality of stormwater discharge will be improved with proposed stormwater treatment and reduced by proposed collection and re-use systems for toilet and urinal flushing, bin washdown and landscape irrigation.
- To reintegrate urban water into the landscape.
  - Project response: landscaping with native vegetation is proposed.

### 4.3 CONSTRUCTION AND BUILDING MANAGEMENT

#### 4.3.1 Construction Management Plan

A construction management plan will be prepared by the Builder to ensure sustainable practices are used within the project construction and a Builder with valid ISO 14001 Environmental Management System accreditation prior to and during the project will be targeted for construction of the building.

- This plan will include details such as:
  - Protection works necessary to road and other infrastructure.
  - Remediation of any damage to road and other infrastructure.
  - Containment of dust, dirt and mud within the site and the method and frequency of clean up procedures in the event of build-up of matter outside the site.
  - On site facilities for vehicle washing.
  - Methods for management of noise and general nuisance.
  - Waste reduction to achieve Green Star target of 90% by mass reduction of construction and demolition waste.
  - Stormwater treatment and management plan.
  - Parking facilities for construction workers.
- During construction the Builder will be required to comply with the following:
  - Any stormwater discharged into the stormwater drainage system must meet with EPA guidelines.
  - Stormwater drainage system protection measures must be installed so that no litter, sediments and pollution (e.g. solid waste, sediment, sand, soil, clay or stones) from the site enter the stormwater drainage system.
  - Vehicle borne material must not accumulate on the roads abutting the site.
  - The cleaning of machinery and equipment must take place on site and not on adjacent footpaths or roads.
  - Litter (including items such as cement bags, food packaging and plastic strapping) must be disposed of responsibly.
  - Site operations must accord with EPA noise control guidelines.

### 4.4 MAINTENANCE PROGRAM

The key elements of stormwater management are:

#### Rainwater Reuse System

- The rainwater reuse pumps are provided with fault detection which alerts building management staff to any failure of the pumping system.
- Rainwater tank provided with access and cleaned as per manufacturer's recommendations to maintain water quality.
- Building management are responsible for ensuring that the rainwater reuse system is maintained appropriately, in accordance with the manufacturer's recommendations.

## 5 Site Management Plan

The site management plan, which details how the site shall be managed through construction and which sets out future operational and maintenance arrangements, shall be prepared by the builder and included within the construction management plan. This plan shall outline construction measures to prevent litter, sediments and pollution entering stormwater systems. Melbourne Water's 'Keeping Our Stormwater Clean: A Builder's Guide' shall be adopted as a guideline.

## 6 Green Star Overview

Green Star is a voluntary environmental rating system developed to assess the design of a variety of types of new buildings and major refurbishments including office buildings, education facilities, multi-unit residential, industrial, healthcare and mixed-use buildings with future tools under development. The Green Star design tools aim to reward and recognize environmental performance excellence by assessing the direct and indirect environmental impact of the building.

Each Green Star tool rates environmental performance against nine categories, with each category having a number of assessment criteria. The categories are:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land Use & Ecology
- Emissions
- Innovation

The Green Star tool is a points-based system with points achieved by meeting set criteria in each of the above categories. There are multiple credits in each category and credits can be worth more than one point.

The points awarded for each credit are summated to provide an overall category score. Each category is then weighted; with category weightings dependent on the environmental impact (e.g. energy is weighted more heavily than materials due to its ongoing impact). The weighted category scores are then added to give an overall score, which is then translated to a star rating.

Ratings from 1 to 6 Stars are given; however, only four, five and six stars are eligible for formal recognition, as Green Star is designed to reward only environmental leaders. The scoring system is described graphically in the figure below.



## 7 Green Star Assessment

An assessment has been conducted based on the documentation provided. Each of the available credits have been reviewed and points targeted based on the ability to incorporate, perceived environmental impact and cost.

The assessment is shown on the following pages and in Appendix A. It is noted that whilst the specific credits targeted may change during detailed development, the minimum number of credits required to achieve a certified 5 Star rating (66 points) shall be maintained.

## 8 Summary of Recommended Initiatives

The preliminary assessment provided the following results:

- **Minimum 66 points**    **5 Star Green Star**    **Australian Excellence**

The requirements of the key credits are detailed below:

### Management

- Green Star Accredited Professional (GSAP) to be employed as part of design team.
- Targets set and committed to for energy, water and indoor environment quality.
- Comprehensive review of design performed by maintenance staff.
- Commitment to perform building tuning over the first twelve months of building operation.
- Independent Commissioning Agent (ICA) to be appointed.
- Project specific Climate Adaptation Plan prepared by Climate Consultant and risk items included within the design.
- Building users guide prepared by design team to educate users on the sustainable features of the building.
- Commitment to setting, measuring and reporting on performance metrics for energy, water, waste and IEQ.
- Commitment to minimise end-of-life waste. Common area finishes to be in place for minimum 10 years.
- Environmental Management Plan to be prepared by builder.
- Building and Head Contractor to be ISO14001 certified.
- Energy and water sub-metering and monitoring systems provided.
- Provide wellbeing and sustainable practices education to construction team.
- Operational Waste Management Plan prepared by a Waste Consultant and implemented in the building design.

### Indoor Environment Quality

- All exhaust systems discharged outside and kitchens enclosed.
- Reverberation times are below that recommended in AS/NZS 2107.
- Partitions between spaces constructed to achieve weighted sound reduction index of at least 45.
- Lighting ballasts to be flicker free and accurately address the perception of colour in the space.
- Artificial lighting levels greater than recommended levels in AS 1680 and lighting fitted with baffles, louvres or opaque diffusers.
- Improvement of lighting levels to task specific areas within apartments.
- Occupants to have localised lighting control.
- Blinds or external shading provided.
- Daylight factor of >2% achieved for 40% of primary spaces.
- Occupied spaces to achieve 60% of floor area within 8m of external window.
- 95% of all paints, carpets, sealants and adhesives to be low VOC.
- 95% of all engineered wood products to be low emission formaldehyde.
- 95% of non-residential spaces achieve a PMV between -1 and +1 for 98% of the year.
- Average NatHERS rating of minimum 7.0 Stars.

### Energy

- 20% improvement in building fabric beyond building regulations (NCC Section J).
- 10% reduction in IPD against BCA J6, independent light switching to each apartment room including kitchen and living separation, and automatic lighting controls in all common areas.
- Improvement in greenhouse gas emissions beyond building regulations (NCC Section J).
- Minimum 3kW Solar PV system.
- Average NatHERS rating of 7.5 Stars; minimum NatHERS rating of 6.1 Stars.
- Peak energy demand is 20% less than reference.

### Transport

- Access to local transport (buses and trams).
- 15% of car parking for fuel efficient vehicles (<5L/100km) or 5% of parking for electric vehicles.
- A significant number of amenities available within 400m of the site.

### Water

- Minimum water efficiency for fixtures, fittings and equipment to be used as follows:
  - Tapware 6 Star WELS
  - Urinals 6 Star WELS
  - WC 4+ Star WELS (max. 3.2L/flush)
  - Showers 3+ Star (4.5-≤6.0L/min)
- Rainwater from non-trafficable roof areas to be collected in rainwater tanks with total volume of minimum 101.2kL, and used for toilet and urinal flushing, bin washdown and irrigation throughout.
- Third pipe connection to all washing machines, and back-up supply to rainwater tanks.
- Landscaping to select drought-tolerant native plants with minimal irrigation requirements.
- Drip irrigation with moisture sensor override installed.
- Fire test water tank provided.
- Waterless air conditioning to be used (air cooled).

### Materials

- 2 points from: Portland cement content is reduced by mass by 30% (1pt) or 40% (2pt). 50% of mix water used is captured or reclaimed (0.5pt). 40% of coarse aggregate is crushed slag or 25% of fine aggregates are manufactured sand (0.5pts).
- 95% of steel to be sourced from an environmentally responsible steel maker.
- 5% reduction in the mass of steel when compared to standard practice.
- 95% of timber is either reused or from a GBCA approved forest certification scheme.
- 90% of all pipework, flooring, blinds and cables either do not contain PVC or meet best practice guidelines.
- Building and fitout products are either reused, contain recycled content, have an environmental product declaration, are 3rd party certified or have a stewardship program, 6% of project contract value.
- Builder to achieve 90% recycling of demolition and construction waste.

### Land Use and Ecology

- Native vegetation selected for landscaping (refer Green Star Ecological Value Calculator, Appendix C).
- Reuse of land (at least 75% of site previously built on).
- Site contamination and remediation in accordance with best practice to be undertaken.
- Heat island effect reduction: 75% of site area contains either vegetation, roof with SRI >82 (white) or hardscaping elements with SRI >39.

### Emissions

- Post-development peak stormwater flow is less than pre-development: runoff to be reduced through rainwater storage and reuse.
- Stormwater quality leaving the site improved via a stormwater treatment.
- Lighting design to ensure no beam light directed outside the site boundaries.
- All external lighting to have an upward light output ratio of less than 5%.
- Air-cooled heat rejection equipment.
- No refrigerant systems or refrigerant to have a GWP <10 or refrigerant leak detection system installed.

### Innovation

- Ultra-low-VOC paint.
- Reduced stormwater pollution targets.
- Comprehensive review of tenancy fitout designs performed by maintenance staff.
- Sustainable site sheds.
- Affordable housing.
- Pre and post occupancy surveys performed on building environmental aspects.
- Development of sustainability marketing strategy.
- Disclosure of Green Star implementation costs to GBCA.
- Green cleaning policy applicable to all common areas.
- Free Wireless Local Area Network (Wi-Fi) is provided at every activity centre in the project.

## 9 Additional Features

Further to the 66 Green Star Design & As-Built credits targeted, the following additional features have been considered for inclusion:

- Green Switch in each apartment to shut off lighting and air-conditioning when unoccupied.
- Energy-efficiency gas domestic hot water system, with solar preheating.
- Energy-efficient, flicker-free luminaires designed to reduce glare.
- High efficiency HVAC systems.
- 161 bicycle parks for residents, 11 for commercial staff, 16 for visitors.
- Basement end of trip facilities for cyclists.
- 3 Motorcycle spaces

Note that a Green Travel Plan will be prepared by a traffic consultant during the detailed design phase.

TTM Consulting note the following:

‘Car Share spaces will be allocated to car share services. Examples of existing car share services include Flexicar and GoGet. These services enable members to rent a vehicle from any location where a car share vehicle is available and return the vehicle to the same location. The Applicant proposes 6 spaces for car share, which satisfies the requirement of Schedule 1 to Clause 37.04.’

## 10 Conclusion

The proposed development at 264-270 Normanby Road, South Melbourne contains sustainable design features to reduce the environmental impact of the building both in operation and construction. This is demonstrated through the following assessments:

- 5 Star Green Star Design and As-Built v1.2 preliminary design assessment (Australian Excellence), addressing the entire development.
- Achievement of planning scheme WSUD requirements.

## Appendix A – Green Star Scorecard















## Appendix B – Sample NatHERS Assessment Report

### Introduction:

Simpson Kotzman have performed an updated House Energy Rating assessment on a selection of apartments within the proposed mixed-use development at 264-270 Normanby Road, South Melbourne using the House Energy Rating software FirstRate5 (V5.2.11) to assess the House Energy Rating of a representative thermally-unique sample of sole-occupancy units.

The residential component of the development comprises Class 2 sole occupancy units. The NCC-BCA requires that the building achieves the following performance for the building fabric when modelled in accordance with approved National House Energy Rating Scheme (NatHERS) Software:

- Each Sole Occupancy Unit shall achieve an energy rating of not less than 5.0 Stars
- The overall average energy rating of all Sole Occupancy Units shall be not less than 6.0 Stars

In addition to the NCC/BCA requirements, the following commitments are proposed to be satisfied in accordance with the Sustainability Management Plan:

- Port Phillip Planning Scheme clause 22.15-4.5 states that the overall average energy rating of all Sole Occupancy Units should be not less than 7.0 Stars.
- Green Star requires that each Sole Occupancy Unit shall achieve an energy rating of not less than 5.5 Stars.
- The Better Apartments Design Standards Victoria require that a dwelling located in Climate Zone 21 Melbourne Central should not exceed an annual cooling load of 30MJ/m<sup>2</sup>.

### Assessment:

A representative sample of 21 apartments has been modelled using FirstRate5-5.2.11 software. This includes a range of layouts and orientations, and the apartments likely to have poor thermal performance ratings. The assessment is based on architectural floor plans and elevations developed by Hayball Architects received 13th November 2019. The energy rating results for the building are listed in the Table below and have been based on the following building fabric assumptions.

### FirstRate NatHERS results:

Apartment No.	Star Rating	Cooling Load (MJ/m <sup>2</sup> )
Level 4 APT 41	6.3	20.2
Level 4 APT 43	7.4	9.6
Level 4 APT 44	7.8	5.8
Level 5 APT 8	6.1	20.7
Level 6 APT 8	6.3	21.4
Level 16 APT 92	8.0	14.4
Level 16 APT 93	8.2	16.3
Level 16 APT 94	8.0	6.9
Level 16 APT 100	7.9	14.2
Level 18 APT 91	7.2	22.9
Level 18 APT 92	8.2	15.2
Level 18 APT 93	8.4	16.9
Level 18 APT 94	8.1	7.3
Level 18 APT 98	7.6	12.4
Level 18 APT 100	8.2	14.7
Level 19 APT 91	6.6	27.1
Level 19 APT 92	7.4	20.2
Level 19 APT 93	7.8	22.0
Level 19 APT 94	7.3	10.7
Level 19 APT 98	6.9	17.2
Level 19 APT 100	7.4	20.1
<b>Lowest Rating (min 5.5 Stars)</b>	<b>6.1</b>	
<b>Average Rating (min 7.0 Stars)</b>	<b>7.5</b>	
<b>Highest Load (max 30 MJ/m<sup>2</sup>)</b>		<b>27.1</b>

### Assumptions:

The energy ratings are based on the following insulation assumptions:

- Floors R2.5 thermal insulation to all floors where exposed to open space or unconditioned area below (i.e. carparks, services, stores, ventilated corridors).
- Walls R2.5 thermal insulation to all heavyweight concrete external walls.  
R1.8 thermal insulation to all heavyweight concrete internal walls (i.e. lift-shafts, stairwells).  
R1.8 thermal insulation to all corridor/apartment walls.  
Plasterboard internal walls unless noted otherwise on plans
- Roof R3.0 thermal insulation (at ceiling level) to all ceilings at Levels 5-34 where exposed above to open space or balconies.  
R4.0 thermal insulation (at ceiling/roof level) to all of Level 35
- Glazing High-performance, double glazed with low-e coating.  
High-performance, bronze glazed louvres.

**Surrounding Buildings:**

The effect of shading by surrounding buildings significantly affects results, and as such careful consideration was made as to how to model the vicinity of the site. Surrounding buildings were modelled based on Schedule 30 to Clause 43.02 (DDO30) within the Port Phillip Planning Scheme (Map 2: Building Heights) for undeveloped sites (including sites currently at planning application stage without Council approval), and actual heights for approved buildings (as provided in Hayball’s 3D context model, received 18/07/2019). As per DDO30, buildings (excluding those already approved) were modelled with 10m setbacks above the podium.

**Glazing Systems Rated:**

Apartment Level	Window Type	Performance Values	
4 - 19	Awning Windows & Casement Doors	U-value	2.91
		SHGC	0.44
	Fixed Windows & Sliding Doors	U-value	2.9
		SHGC	0.51

It is noted that window openabilities and dimensions have not all been detailed on documentation yet, so modelling was based on general design advice received. Results may vary once the extent of glazing has been confirmed.

An overall sample average rating of 7.5 Stars is achieved, meeting all planning requirements for the development.

Results indicate that a double glazed low-e system will be required throughout the development, with thermally-broken frames. Depending on the glazing scheme chosen, some apartments may require reduced glazing areas or improved insulation to comply with the NCC/BCA and SMP requirements.

**Summary:**

As can be seen from the preliminary results, the Minimum 5.5 Star, Average 7.0 Star and 30MJ/m<sup>2</sup>/annum Cooling Load Limit requirements have the potential to be achieved.

## Appendix C – Green Star Ecological Value Calculator

### Green Star Design & As Built

Ecological Value Calculator



User Input Cells

Please enter project information in the light blue cells only.

Land Type	Weighting	Before			After		
		Area (m <sup>2</sup> )		Score	Area (m <sup>2</sup> )		Score
		Plan area	Green wall		Plan area	Green wall	
Hard surface	0.00	2,023	-	0.00	1,819	-	0.00
Exotic vegetation	0.05			0.00			0.00
Non-improved pastures	0.35		-	0.00		-	0.00
Planted native vegetation	0.50			0.00	203		101.62
Artificial water-bodies	0.50		-	0.00		-	0.00
Regenerating native habitat (re-growth) < 5 years old	0.50		-	0.00		-	0.00
Regenerating native habitat (re-growth) 5 – 10 years old	0.75		-	0.00		-	0.00
Regenerating native habitat (re-growth) > 10 years old	0.90		-	0.00		-	0.00
Remnant native vegetation	1.00		-	0.00		-	0.00
Natural water-bodies	1.00		-	0.00		-	0.00
<b>Total</b>		<b>2,023</b>	<b>-</b>	<b>0.00</b>	<b>2,023</b>	<b>-</b>	<b>101.62</b>
<b>Ecological Value Score</b>				<b>0.00</b>			<b>0.05</b>

Check Areas Match	TRUE
Total Change in Ecological Value	0.050
Points Achieved	1.4
This project automatically meets the minimum requirement of this credit due to the lack of habitat present in the 'Before' state of the site.	

Improvement in Ecological Value	Points
0.01	1
0.10	2
0.20	3

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