

# **PROPOSED RESIDENTIAL DEVELOPMENT**

8 Louise St, Melbourne

## **SUSTAINABLE MANAGEMENT PLAN & WATER SENSITIVE URBAN DESIGN RESPONSE**

**FOR**

**8 LOUISE ST HOLDINGS PTY LTD**

3 August 2021

File 1592A



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# 1. Introduction

Ark Resources has been engaged by 8 Louise St Holdings Pty Ltd to provide advice in relation to environmentally sustainable development outcomes from the proposed development at 8 Louise St, Melbourne.

This Sustainable Management Plan has been prepared to meet the Application Requirements of Clauses 19.03-3S and 22.13 (Environmentally Sustainable Development Policy) of the Port Phillip Planning Scheme. This report demonstrates how the development meets policy objectives of Clause 22.13-2, 22.13-4, 22.12 and 53.18 (WSUD Policy) of the Planning Scheme.

This report contains a summary of:

- Environmental objectives adopted for the development
- Sustainable design initiatives integrated into the design of the project.

Performance outcomes in this report are based on:

- Discussions and correspondence with:
  - Benedict Crowe, Samuel Property
  - Yunwei Xu, Cera Stribley Architects
- Architectural drawings prepared by Cera Stribley Architects set out below.

Description	Drawing No.	Revision	Date
DRAWING LIST	TP.0000	A	4/08/2021
PROPOSED SITE PLAN	TP.0300	A	4/08/2021
PROPOSED BASEMENT 03 PLAN	TP.1091	A	4/08/2021
PROPOSED BASEMENT 02 PLAN	TP.1092	A	4/08/2021
PROPOSED BASEMENT 01 PLAN	TP.1093	A	4/08/2021
PROPOSED GROUND FLOOR PLA	TP.1100	A	4/08/2021
PROPOSED LEVEL 01 PLAN	TP.1101	A	4/08/2021
PROPOSED LEVEL 02 PLAN	TP.1102	A	4/08/2021
PROPOSED LEVEL 03 PLAN	TP.1103	A	4/08/2021
PROPOSED LEVEL 04-07 PLAN	TP.1104	A	4/08/2021
PROPOSED LEVEL 08-12 PLAN	TP.1108	A	4/08/2021
PROPOSED LEVEL 13 PLAN	TP.1113	A	4/08/2021
PROPOSED LEVEL 14 PLAN	TP.1114	A	4/08/2021
PROPOSED LEVEL 15 PLAN	TP.1115	A	4/08/2021
PROPOSED LEVEL 16 PLAN	TP.1116	A	4/08/2021
PROPOSED ROOF PLAN	TP.1150	A	4/08/2021
STREETSCAPE ELEVATION 01	TP.2000	A	4/08/2021

Description	Drawing No.	Revision	Date
STREETSCAPE ELEVATION 02	TP.2001	A	4/08/2021
NORTH ELEVATION	TP.2100	A	4/08/2021
EAST ELEVATION	TP.2101	A	4/08/2021
SOUTH ELEVATION	TP.2102	A	4/08/2021
WEST ELEVATION	TP.2103	A	4/08/2021
SECTION 01	TP.3000	A	4/08/2021
SECTION 02	TP.3001	A	4/08/2021
SECTION 03	TP.3002	A	4/08/2021
SECTION 04	TP.3003	A	4/08/2021
ONE BED TYPOLOGIES 01	TP.5000	A	4/08/2021
ONE BED TYPOLOGIES 02	TP.5001	A	4/08/2021
TWO BED TYPOLOGIES 01	TP.5100	A	4/08/2021
TWO BED TYPOLOGIES 02	TP.5101	A	4/08/2021
TWO BED TYPOLOGIES 03	TP.5102	A	4/08/2021
TWO BED TYPOLOGIES 04	TP.5103	A	4/08/2021
TWO BED TYPOLOGIES 05	TP.5104	A	4/08/2021
TWO BED TYPOLOGIES 06	TP.5105	A	4/08/2021
THREE BED TYPOLOGIES 01	TP.5200	A	4/08/2021
THREE BED TYPOLOGIES 02	TP.5201	A	4/08/2021
THREE BED TYPOLOGIES 03	TP.5202	A	4/08/2021
FOUR BED TYPOLOGIES 01	TP.5300	A	4/08/2021
FOUR BED TYPOLOGIES 02	TP.5301	A	4/08/2021
PROPOSED SHADOWS 9AM SEP	TP.8000	A	4/08/2021
PROPOSED SHADOWS 10AM SEP	TP.8001	A	4/08/2021
PROPOSED SHADOWS 11AM SEP	TP.8002	A	4/08/2021
PROPOSED SHADOWS 12PM SEP	TP.8003	A	4/08/2021
PROPOSED SHADOWS 1PM SEP	TP.8004	A	4/08/2021
PROPOSED SHADOWS 2PM SEP	TP.8005	A	4/08/2021
PROPOSED SHADOWS 3PM SEP	TP.8006	A	4/08/2021

## 2. Site Description

The proposed development comprises 104 residential apartments with 223 bedrooms. It is anticipated that approximately 323 people will reside in the development.

The building comprises the following uses:

Level	Use
Basement 03	<ul style="list-style-type: none"> <li>Carparking (32 spaces), rainwater tank, bike parking (34 spaces), storage</li> </ul>
Basement 02	<ul style="list-style-type: none"> <li>Carparking (31 spaces), bike parking (28 spaces), storage, services</li> </ul>
Basement 01	<ul style="list-style-type: none"> <li>Carparking (26 spaces), bike parking (10 spaces), storage, services</li> </ul>
Ground Floor	<ul style="list-style-type: none"> <li>Retail tenancy, residential lobby, bike parking (4 spaces), resident's communal and fitness areas, bin room, carpark entry, services</li> </ul>
Level 1	<ul style="list-style-type: none"> <li>8 Apartments (14 bedrooms)</li> </ul>
Level 2	<ul style="list-style-type: none"> <li>8 Apartments (16 bedrooms)</li> </ul>
Level 3	<ul style="list-style-type: none"> <li>7 Apartments (15 bedrooms)</li> </ul>
Level 4	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 5	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 6	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 7	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 8	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 9	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 10	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 11	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 12	<ul style="list-style-type: none"> <li>7 Apartments (14 bedrooms)</li> </ul>
Level 13	<ul style="list-style-type: none"> <li>6 Apartments (14 bedrooms)</li> </ul>
Level 14	<ul style="list-style-type: none"> <li>6 Apartments (14 bedrooms)</li> </ul>
Level 15	<ul style="list-style-type: none"> <li>3 Apartments (12 bedrooms)</li> </ul>
Level 16	<ul style="list-style-type: none"> <li>3 Apartments (12 bedrooms)</li> </ul>
Roof	<ul style="list-style-type: none"> <li>Solar PV system</li> </ul>

The development is located within the City of Port Phillip and has a total site area of approximately 1,221 m<sup>2</sup>. The surrounding buildings are a mixture of residential and commercial use.

An image of the site and the surrounding locale is provided below.

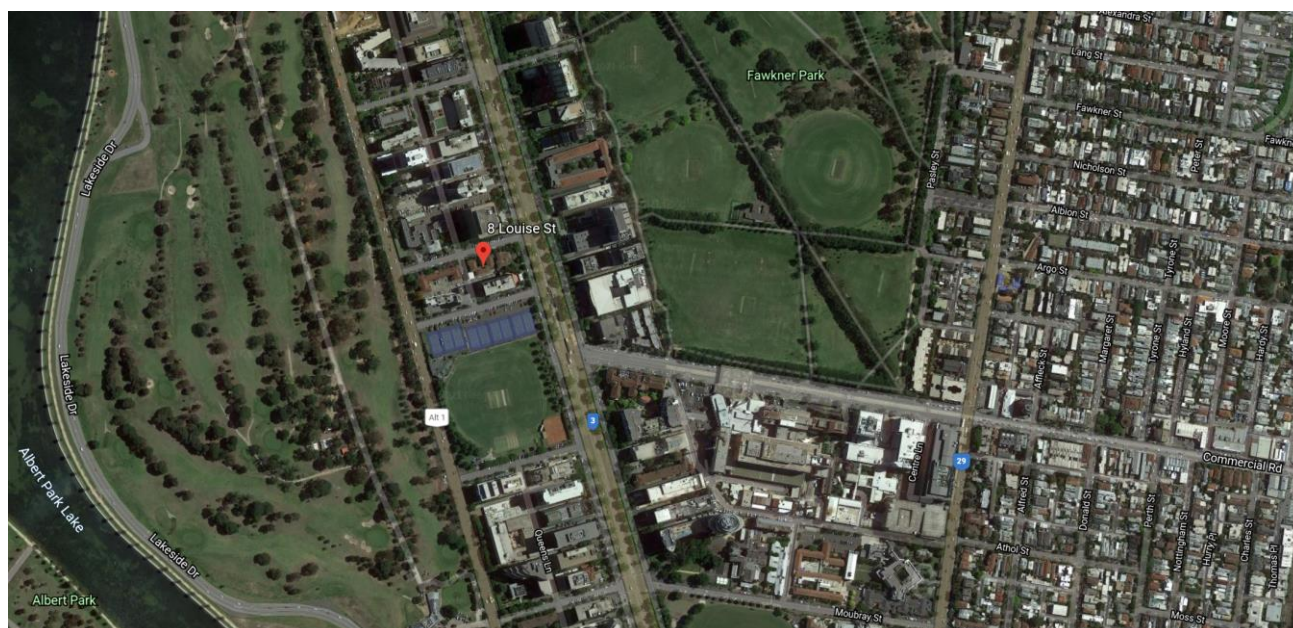


Image accessed July 2021 ©Google Earth

### 3. Summary of Key ESD Initiatives

A detailed analysis has been undertaken in order to nominate the ESD initiatives required and confirm the performance outcomes achieved. The results of this analysis are set out in the remainder of this report.

The following key sustainable design initiatives have been incorporated into this project:

- 25 kW rooftop solar photovoltaic system;
- Rainwater harvesting system for toilet flushing and irrigation;
- High-performance glazing and energy efficient building services, appliances and fixtures; and
- Environmentally preferable internal finishes.

An assessment of sustainable design outcomes of the proposed development has been undertaken with *BESS*, *STORM* and *FirstRate* benchmarking tools. The information presented in this report demonstrates that:

- The development will achieve a minimum average NatHERS energy rating of 6.5 stars.
- The combination of design features and services initiatives meets all the standards of the *BESS* sustainability assessment tool.
- The rainwater harvesting system is predicted to result in an annual mains water saving of 385 kL;
- The development meets the Best Practice standard for stormwater quality.

The results of the performance assessment are summarised below.



### 3.1. Built Environment Sustainability Scorecard (BESS)

The BESS assessment tool for new projects was developed by the Council Alliance for a Sustainable Built Environment (CASBE).

The BESS tool provides an objective performance based analysis of *nine* key sustainable building design categories at the planning permit stage of the building lifecycle.

BESS is widely regarded as an appropriate sustainability assessment tool for both residential and non-residential development projects. Since its launch, several Victorian councils including Banyule, Bass Coast, Bayside, Bendigo, Brimbank, Darebin, Dandenong, Geelong, Hobsons Bay, Hume, Kingston, Knox, Manningham, Maribyrnong, Maroondah, Monash, Moonee Valley, Moreland, Port Phillip, Stonnington, Whitehorse, Whittlesea, Wyndham, Yarra and Yarra Ranges have adopted BESS.

The BESS tool builds on the NCC energy efficiency measures and provides a framework for assessing building performance outcomes in relation to:

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

BESS scores for the development are summarised in the following table.

Element	Required Score	Project Score	Compliance
Management	0%	48%	Yes
Water	50%	57%	Yes
Energy	50%	53%	Yes
Stormwater	100%	100%	Yes
Indoor Environment Quality	50%	72%	Yes
Transport	0%	20%	Yes
Waste	0%	33%	Yes
Urban Ecology	0%	21%	Yes
Innovation	0%	0%	Yes
<b>Project BESS Score</b>	<b>50%</b>	<b>52%</b>	Yes

The project meets the standard required for *water, energy, stormwater and Indoor Environment Quality*. The project also meets the 50% BESS Score required to demonstrate Best Practice.

Please refer Appendix A for the BESS Report.



### 3.2. Energy Ratings

FirstRate5 (Version 5.3.0a (3.21)) energy ratings have been undertaken for a representative sample of the apartments and are summarised in the table below.

Apartment	Star Rating	Energy Demand (MJ/m <sup>2</sup> )		
		Total	Heating	Cooling
105	7.8	59.5	44.3	15.2
106	5.4	131.1	110.4	20.7
107	5.9	118.9	97.7	21.2
108	6.4	98.4	68.5	29.9
306	6.4	100.7	72.6	28.1
307	6.9	85.6	59.3	26.3
1401	6.6	96.4	70.4	26.0
1402	7.7	62.0	50.0	12.0
1404	6.2	106.6	82.4	24.2
1405	6.9	85.9	64.3	21.6
1406	6.4	101.0	81.0	20.0
1501	6.4	98.3	74.4	23.9
1502	7.2	78.7	55.8	22.9
1503	6.1	109.5	85.8	23.7
1601	5.5	130.1	105.0	25.1
1602	6.1	112.3	91.8	20.5
1603	5.1	144.2	117.6	26.6
<b>Estimated Development Average</b>	<b>6.5</b>	<b>101.1</b>	<b>78.3</b>	<b>22.8</b>

The energy ratings set out above indicate that the development will exceed the standard required by the National Construction Code 2019 in relation to residential sustainability.

The results of the modelling confirm that all apartments have a cooling load less than 30MJ/m<sup>2</sup> (NatHERS Climate Zone 21 Melbourne) and therefore meet the energy efficiency objectives set out in clause 58.03-1 of the Planning Scheme. All other apartments in the development are expected to have similar or lower cooling loads.

The results of the modelling also confirm that the average heating load of less than 88 MJ/m<sup>2</sup> and the average cooling load of less than 36 MJ/m<sup>2</sup> for the development has been met. The heating load does not exceed 120 MJ/m<sup>2</sup> and the cooling load does not exceed 62 MJ/m<sup>2</sup> for each apartment. Therefore, the development meets the energy efficiency objectives set out in NCC 2019 for Class 2 dwellings.

Please refer to Appendix B for details of energy ratings and building construction assumptions.

## 4. Sustainable Design Initiatives and Systems

Issue	Performance Commitments / Description	Comments
<b>Building Management</b>		
Metering	<p>In addition to individual apartment meters for utilities, the following meters will be installed to provide information to the owner's corporation in relation to centralised building systems and common area energy consumption:</p> <ul style="list-style-type: none"> <li>• Harvested rainwater supply line</li> <li>• Gas meter for hot water plant</li> <li>• Common area lift and lighting meter</li> <li>• Car park lighting &amp; power meter</li> <li>• Photovoltaic system generation meter</li> </ul>	The information collected from these meters will be used by the Owner's Corporation manager to assess the function and efficacy of central systems during commissioning and ongoing operation.
<b>Water</b>		
Water Efficiency	<p>The following water efficient fittings and appliances will be specified:</p> <ul style="list-style-type: none"> <li>• WELS 3 star showers (&gt;6 but &lt;=7.5 litres/minute)</li> <li>• Contemporary bath</li> <li>• WELS 4 star toilets</li> <li>• WELS 5 star kitchen taps</li> <li>• WELS 6 star basin taps</li> <li>• WELS 5 star dishwashers</li> </ul>	Water using fixtures and appliances will be specified during design development in accordance with this water efficiency performance standard.
Rainwater Harvesting	<p>A rainwater harvesting system will be installed comprising:</p> <ul style="list-style-type: none"> <li>• Rainwater harvesting from all roof areas (catchment area of approx. 743m<sup>2</sup>);</li> <li>• A total storage volume of 20,000 litres;</li> <li>• Re-use of water for toilet flushing in all toilets; and</li> <li>• Re-use of water for landscape irrigation</li> </ul>	<p>Rainwater modelling indicates that this system will provide an estimated annual mains water saving of 385 kL and a supply reliability of 45% from toilet flushing and irrigation.</p> <p>STORM results are provided in Appendix C, refer to Appendix D for details of predicted harvested rainwater volumes and Appendix E for an indicative maintenance program.</p>

Issue	Performance Commitments / Description	Comments
Water Efficient Landscaping	<p>Where appropriate, water sensitive landscape design will be incorporated into the development by specifying a combination of the following:</p> <ul style="list-style-type: none"> <li>• Drought tolerant and/or indigenous plant species that are best suited to local climate;</li> <li>• Automated drip irrigation system; and</li> <li>• Re-use of harvested rainwater for irrigation to all landscaping</li> </ul>	These initiatives will ensure efficient use of water and also reduce the total potable water used for landscape works.
Fire System Test Water	Fire pump test water to be harvested and re-used.	
Swimming pool	A swimming pool is located in the communal gymnasium.	
<b>Energy</b>		
Renewable Energy System	<p>A solar photovoltaic system will be installed to offset greenhouse emissions arising from common area energy usage and will provide a total peak generation capacity of 25 kW.</p> <p>The solar panels will be distributed on the roof so that all residents benefit equally from the energy savings and greenhouse gas emissions reductions.</p>	<p>Note that the system is predicted to result in equivalent avoided greenhouse emissions of approximately 39 tonnes CO2-e each year.</p> <p>Refer to Appendix F for details of proposed system capacity and panel numbers.</p>
Thermal performance efficiency – Non-residential	<p>Roof and floor insulation specifications will be a 10% improvement on Section J 2019 requirements.</p> <p>Walls and window performance will meet NCC 2019 J1.5 façade requirements.</p>	
Apartment Energy Ratings	The development will achieve an average energy rating of 6.5 stars.	<p>The development energy rating achieved exceeds the NCC 2019 energy efficiency requirements for Class 2 dwellings.</p> <p>Refer to Appendix B for details of building fabric assumptions.</p>
Heating & Cooling	Space heating and cooling will be provided by a centralised VRF system with energy efficiency within one star of the best available at the time of tender.	Efficient reverse cycle units in conjunction with a thermally efficient building envelope are considered to be an environmentally acceptable method of space conditioning.

Issue	Performance Commitments / Description	Comments
Domestic Hot Water	Domestic hot water will be provided by an efficient central gas instantaneous hot water system with a minimum appliance efficiency of 86% and a highly insulated circulating loop to reduce parasitic heat losses.	
Lighting - Apartments	<p>Energy efficient lighting systems will be installed throughout the development including:</p> <ul style="list-style-type: none"> <li>• LED lighting generally to apartments designed to achieve a maximum lighting power density of at least 20% lower than required by Table J6.2a of the NCC;</li> <li>• LED lights controlled with occupancy sensors and daylight sensors (as appropriate) to corridors and public areas; and</li> <li>• LED external lighting.</li> </ul>	Note that external lighting for the development will be designed with the objective of preventing light spill to the night sky.
Lighting – Non-residential	Lighting will be designed to meet the lighting power density requirements in Table J6.2a of the NCC 2019 Vol 1.	Note that external lighting for the development will be designed with the objective of preventing light spill to the night sky.
Clothes Drying Facilities	All apartments will be provided with retractable clothes lines.	The installation of clothes lines will reduce the energy use assigned to clothes dryers.
Carpark Ventilation	To reduce energy use and greenhouse emissions from the basement car park mechanical ventilation system, energy use will be minimised by the use of a variable speed fan motor and appropriate controls including CO monitoring.	
<b>Stormwater Management</b>		
Stormwater Quality	The development achieves a STORM score of 108% because of the rainwater harvesting system described under the 'Water' category in this report.	<p>The STORM score attained demonstrates that the development attains the Best Practice Standard for Urban Stormwater.</p> <p>Refer to Appendix C for the STORM report.</p>

Issue	Performance Commitments / Description	Comments
Construction Stormwater Pollution Reduction Plan	A construction phase stormwater pollution reduction plan will be prepared and implemented during construction to ensure that litter, sediments and other pollution are prevented from entering the stormwater system.	Please refer to Appendix G for the preliminary Site Management Plan.
<b>Indoor Environment Quality</b>		
Natural Ventilation & Daylight	<p>The building has been designed to ensure that all living rooms and bedrooms have access to natural ventilation and daylight via operable windows along the façade.</p> <p>As per the CISBE Design Guide 2017, single sided rooms are considered to be adequately ventilated up to 10m, however the air movement is likely to be imperceptible without the addition of ceiling fans. Ventilation for single sided apartments will be assisted with the installation of ceiling fans to Living/Kitchen areas and we have claimed these apartments as naturally ventilated in BESS.</p>	These features will improve comfort and amenity for residents and reduce peak energy demand and greenhouse emissions arising from mechanical cooling.
Mechanical Ventilation – Non-residential	The mechanical ventilation system will be designed to achieve an increase in outdoor air (in L/s) of at least 50% above the AS 1668.2:2012 requirements for non-residential areas.	
Thermal Comfort	Thermal comfort for occupants will be enhanced by the specification of high performance glazing.	Note that most of the apartments will receive direct sunlight due to the arrangement of apartments within each floor plate.
Volatile Organic Compounds	<p>All interior paints, adhesives and sealants will be Low VOC type to improve indoor environmental quality for residents.</p> <p>Low VOC carpets will be selected for the development.</p> <p>Low formaldehyde engineered wood products (minimum E1 grade) will be specified.</p>	Low VOC paints, adhesives and sealants, carpets and engineered wood products will be specified to meet the requirements Indoor Pollutants (Credit 13) of the Green Star Design & As Built Tool Version 1.3, or alternative green product certification such as GECA or Green Tag.

Issue	Performance Commitments / Description	Comments
<b>Sustainable Transport</b>		
Bicycle Facilities	<p>Bicycle storage facilities have been provided to encourage bicycle use by including:</p> <ul style="list-style-type: none"> <li>• 72 racks for the residents and retail staff in the basement carparks</li> <li>• 4 racks for visitors</li> </ul>	<p>Note that the bicycle facilities provided exceed the ratio set out in Clause 52.34 of the Port Phillip Planning Scheme.</p>
Electric Vehicle Charging	<p>Electric vehicle infrastructure to ensure the car park is 'electric vehicle ready' including:</p> <ul style="list-style-type: none"> <li>• Electric vehicle chargers installed to 5% of car-parking spaces. Chargers will be 3-phase 22kW IEC 62196 Type 2 Mode 3 with energy metering and remote comms capability (WiFi /Ethernet/4G) using OCCP J1.6 protocol;</li> <li>• A scalable load management system with circuit current monitoring to ensure peak power demand for EV charging can exceed neither: <ul style="list-style-type: none"> <li>○ installed building substation / approved network connection capacity when combined with total building demand; nor</li> <li>○ EV charger circuit(s) capacity, which shall be provided with containment infrastructure (conduit/cable tray/busbar and expanded distribution boards) to allow 20% of future chargers (assumed to be 7kW single phase) for all remaining parking bays to charge at full load capacity.</li> </ul> </li> </ul>	

Issue	Performance Commitments / Description	Comments
Walkability & Public Transport Access	<p>The site attains a Walk Score® of 92 out of 100 which is defined as 'Walker's Paradise', and a Transit Score of 92 out of 100 which is defined as 'Rider's Paradise'.</p> <p>The site has numerous amenities within a walking distance (&lt;300m) such as schools, cafés and parks. Shopping and local services are available in South Melbourne, South Yarra and Prahran, which are easily accessible with bicycles or public transport. Building occupants won't require a car to run daily errands.</p> <p>The site is also within close proximity of convenient public transportation options including St Kilda Road trams. Prahran station is less than 1.5km from the site.</p>	The location of the development will facilitate walking and public transport in lieu of private vehicle use.
<b>Waste Management</b>		
Operational Waste Management	For details of waste generation rates and collection logistics, refer to the Waste Management Plan.	
Construction Waste Minimisation	<p>A target recycling rate of 80% of construction and demolition waste has been adopted for the construction phase of the development to minimise the volume of waste to landfill.</p> <p>This will be achieved by the development of a comprehensive waste minimisation strategy including:</p> <ul style="list-style-type: none"> <li>• Separation of all commercially viable recyclable waste streams;</li> <li>• Training in waste minimisation for all site staff and contractors to form part of site induction training;</li> <li>• Record keeping of landfill waste and recyclable stream volumes to track performance against the 80% recyclable target; and</li> <li>• Quarterly reporting of volumes and percentages for each waste stream.</li> </ul>	A dedicated recycling contractor will be engaged to facilitate separation of commercially viable recyclable waste streams in accordance with the target adopted.
<b>Urban Ecology</b>		
Private Open Space	A tap and floor waste will be provided to each balcony or terrace.	



Issue	Performance Commitments / Description	Comments
Maintaining/Enhancing Ecological Value	Planter boxes have been integrated into the proposed design.	These features will provide amenity for building occupants and contribute to the ecological value of the proposed development.
<b>Building Materials</b>		
Environmentally Preferable Materials	<p>The following environmentally preferable materials will be specified with the objective of reducing off-site environmental impacts and improving indoor environmental quality for residents:</p> <ul style="list-style-type: none"> <li>All feature timber will be recycled or from accredited sustainably harvested plantation sources (FSC or AFS)</li> </ul>	Timber products will be specified in accordance with the requirements of Credit 20.2 of the Green Star Design & As Built Tool Version 1.2.

## 5. Implementation Strategy

The ESD initiatives set out in this report will be coordinated by the Project Manager in conjunction with the following project design team members:

- Architect
- Thermal Performance Assessor
- Building Services Consultant
- Waste Management Consultant

An implementation schedule is set out in the following table.

ESD Initiative Implementation Schedule				
#	Initiative	Requirement	Responsibility	Stage
	Coordination of Initiatives	Full implementation	Project Manager	All
1	Metering	Specify meters in accordance with nominated schedule	Building Services Engineer	Design Development
2	Water Efficiency	Specify fixtures in accordance with nominated WELS star ratings	Architect	Design Development
3	Rainwater Harvesting	Design and specify rainwater harvesting system including toilet flushing & automated irrigation system	Building Services Engineer	Design Development
4	Landscaping	Specify water efficient landscaping and irrigation	Landscape architect	Design Development
5	Apartment Energy Ratings	Prepare NatHERS ratings for NCC certification	Thermal Performance Assessor	Design Development
6	Heating & Cooling	Specify units in accordance with nominated MEPS star ratings	Building Services Engineer	Design Development
7	Hot Water	Specify nominated hot water system	Building Services Engineer	Design Development
8	Lighting	Specify nominated energy efficient lighting types and automated controls	Building Services Engineer	Design Development

ESD Initiative Implementation Schedule				
#	Initiative	Requirement	Responsibility	Stage
9	Carpark Ventilation	CO sensors installed	Building Services Engineer	Design Development
10	Environmentally Preferable Materials	Specify materials in accordance with nominated schedule.	Architect	Design Development
11	Bicycle Facilities	Specify bike racks & hoops	Architect	Design Development
12	Construction Waste Minimisation	Prepare construction waste minimisation plan	ESD consultant	Design Development
13	Private Open Space	Specify tap and floor waste to each balcony or terrace	Architect	Design Development
14	Clothes lines	Specify clothes lines for each apartment	Architect	Design Development

## 6. Conclusion

This report sets out a range of sustainable design features, which are integrated into the design and specification of the proposed development, to improve environmental outcomes during occupation.

In terms of performance outcomes, the analysis presented in this report demonstrates that the proposed development:

- Attains an overall BESS score of 52% and passes the mandatory water, energy, stormwater and indoor environment quality elements;
- Achieves a 6.5 average star rating for the apartments
- Attains the *Best Practice* standard for urban stormwater quality

Accordingly, the sustainable design outcomes from the proposed development are adequate for a residential development of this scale and are consistent with the objectives set out in Clauses 19.03-3S and 22.13 (ESD Policy) of the Port Philip Planning Scheme.



Jan Talacko  
Director

## Appendix A. BESS Results

BESS, 8 Louise St Melbourne 3004

### BESS Report

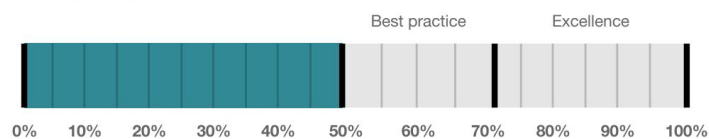
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 8 Louise St Melbourne VIC 3004. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Port Phillip City Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

#### Your BESS Score



# 52%

#### Project details

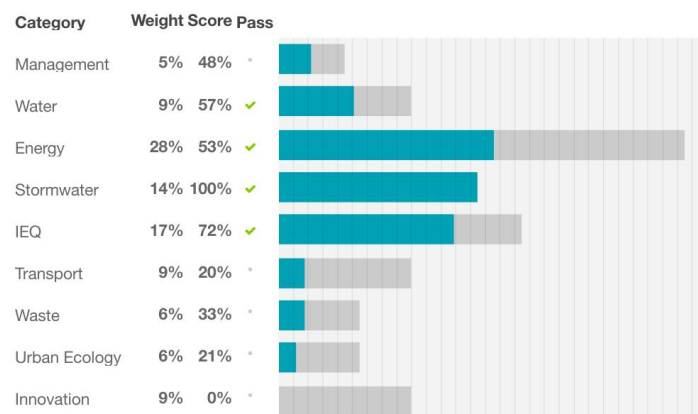
Address 8 Louise St Melbourne VIC 3004  
Project no 87434567-R1  
BESS Version BESS-6

Site type Mixed use development  
Account ld@arkresources.com.au  
Application no.  
Site area 1,221 m<sup>2</sup>  
Building floor area 9,022.9 m<sup>2</sup>  
Date 03 August 2021  
Software version 1.7.0-B.365

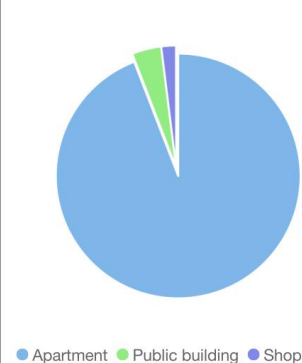


#### Performance by category

● Your development ● Maximum available



#### Building Type composition



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## Buildings

Name	Height	Footprint	% of total footprint
B1	17	1,221 m <sup>2</sup>	100%

## Dwellings & Non Res Spaces

### Dwellings

Name	Quantity	Area	Building	% of total area
<b>Apartment</b>				
Group 2	57	96.6 m <sup>2</sup>	B1	61%
Group 1	40	54.4 m <sup>2</sup>	B1	24%
Group 6	2	149 m <sup>2</sup>	B1	3%
Group 7	1	186 m <sup>2</sup>	B1	2%
Group 3	1	186 m <sup>2</sup>	B1	2%
Group 10	1	58.1 m <sup>2</sup>	B1	< 1%
Group 9	2	43.2 m <sup>2</sup>	B1	< 1%
<b>Total</b>	<b>104</b>	<b>8,495 m<sup>2</sup></b>	<b>94%</b>	

### Non-Res Spaces

Name	Quantity	Area	Building	% of total area
<b>Shop</b>				
Retail	1	177 m <sup>2</sup>	B1	1%
<b>Total</b>	<b>1</b>	<b>177 m<sup>2</sup></b>	<b>1%</b>	
<b>Public building</b>				
Communal	1	350 m <sup>2</sup>	B1	3%
<b>Total</b>	<b>1</b>	<b>350 m<sup>2</sup></b>	<b>3%</b>	

## Credit summary

Management Overall contribution 4.5%



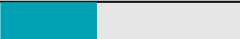


		48%
1.1 Pre-Application Meeting		0%
2.2 Thermal Performance Modelling - Multi-Dwelling Residential		100%
2.3 Thermal Performance Modelling - Non-Residential		0%
3.1 Metering		100%
3.2 Metering		100%
3.3 Metering		100%
4.1 Building Users Guide		0%

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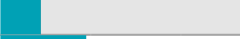














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**Water Overall contribution 9.0%**

		Minimum required 50%	57%  Pass
1.1 Potable water use reduction		40%	
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use Reduction		100%	

**Energy Overall contribution 27.5%**

		Minimum required 50%	53%  Pass
1.1 Thermal Performance Rating - Non-Residential		37%	
1.2 Thermal Performance Rating - Residential		16%	
2.1 Greenhouse Gas Emissions		100%	
2.2 Peak Demand		5%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		5%	
3.1 Carpark Ventilation		100%	
3.2 Hot Water		5%	
3.4 Clothes Drying		100%	
3.6 Internal Lighting - Residential Multiple Dwellings		100%	
3.7 Internal Lighting - Non-Residential		100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	 Scoped Out
No cogeneration or trigeneration system in use.			
4.2 Renewable Energy Systems - Solar		94%	
4.4 Renewable Energy Systems - Other		N/A	 Disabled
No other (non-solar PV) renewable energy is in use.			

**Stormwater Overall contribution 13.5%**

		Minimum required 100%	100%  Pass
1.1 Stormwater Treatment		100%	

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**IEQ Overall contribution 16.5%**

			Minimum required 50%	72%	✔ Pass
	1.1 Daylight Access - Living Areas			66%	
	1.2 Daylight Access - Bedrooms			66%	
	1.3 Winter Sunlight			0%	
	1.4 Daylight Access - Non-Residential			73%	✔ Achieved
	1.5 Daylight Access - Minimal Internal Bedrooms			100%	
	2.1 Effective Natural Ventilation			100%	
	2.3 Ventilation - Non-Residential			33%	✔ Achieved
	3.4 Thermal comfort - Shading - Non-residential			0%	
	3.5 Thermal Comfort - Ceiling Fans - Non-Residential			0%	
	4.1 Air Quality - Non-Residential			100%	

**Transport Overall contribution 9.0%**

		20%
1.1 Bicycle Parking - Residential	<div><div></div></div>	0%
1.2 Bicycle Parking - Residential Visitor	<div><div></div></div>	0%
1.3 Bicycle Parking - Convenience Residential	<div><div></div></div>	N/A <span>⊘ Disabled</span>
	Credit 1.1 must be achieved first.	
1.4 Bicycle Parking - Non-Residential	<div><div></div></div>	33%
1.5 Bicycle Parking - Non-Residential Visitor	<div><div></div></div>	0%
1.6 End of Trip Facilities - Non-Residential	<div><div></div></div>	N/A <span>⊘ Disabled</span>
	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure	<div><div></div></div>	100%
2.2 Car Share Scheme	<div><div></div></div>	0%
2.3 Motorbikes / Mopeds	<div><div></div></div>	0%

**Waste Overall contribution 5.5%**

		33%
1.1 - Construction Waste - Building Re-Use	<div><div></div></div>	0%
2.1 - Operational Waste - Food & Garden Waste	<div><div></div></div>	0%
2.2 - Operational Waste - Convenience of Recycling	<div><div></div></div>	100%

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**Urban Ecology Overall contribution 5.5%**

		21%
1.1 Communal Spaces		0%
2.1 Vegetation		25%
2.2 Green Roofs		0%
2.3 Green Walls and Facades		0%
2.4 Private Open Space - Balcony / Courtyard Ecology		100%
3.1 Food Production - Residential		0%
3.2 Food Production - Non-Residential		0%

**Innovation Overall contribution 9.0%**

		0%
1.1 Innovation		N/A <input checked="" type="checkbox"/> Disabled
Please enter at least one innovation.		

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**Credit breakdown****Management** Overall contribution 2%

<b>1.1 Pre-Application Meeting</b>	0%
Score Contribution	This credit contributes 37.5% towards the category score.
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?
Question	Criteria Achieved ?
Project	No
<b>2.2 Thermal Performance Modelling - Multi-Dwelling Residential</b>	100%
Score Contribution	This credit contributes 23.5% towards the category score.
Criteria	Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings?
Question	Criteria Achieved ?
Apartment	Yes
<b>2.3 Thermal Performance Modelling - Non-Residential</b>	0%
Score Contribution	This credit contributes 1.5% towards the category score.
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2019 Section J1.5?
Question	Criteria Achieved ?
Shop	No
Public building	No
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2019 Section J (Energy Efficiency), NABERS or Green Star?
Question	Criteria Achieved ?
Shop	No
Public building	No
<b>3.1 Metering</b>	100%
Score Contribution	This credit contributes 11.8% towards the category score.
Criteria	Have utility meters been provided for all individual dwellings?
Question	Criteria Achieved ?
Apartment	Yes
<b>3.2 Metering</b>	100%
Score Contribution	This credit contributes 0.7% towards the category score.
Criteria	Have utility meters been provided for all individual commercial tenants?
Question	Criteria Achieved ?
Shop	Yes
Public building	Yes

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<b>3.3 Metering</b>		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Apartment	Yes	
Shop	Yes	
Public building	Yes	
<b>4.1 Building Users Guide</b>		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	No	

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**Water** Overall contribution 5% Minimum required 50%

<b>Water Approach</b>	
What approach do you want to use for Water?:	Use the built in calculation tools
<b>Project Water Profile Question</b>	
Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	Yes
Are you installing a rainwater tank?:	Yes
<b>Water fixtures, fittings and connections</b>	
Building: All	B1
<b>Showerhead:</b>	
Group 1	4 Star WELS (>= 6.0 but <= 7.5)
Group 2	
Group 3	
Group 6	
Group 7	
Group 9	
Group 10	
Communal	
Retail	Scope out
<b>Bath:</b>	
Group 1	Scope out
Retail	
Group 2	
Group 3	
Group 10	
Communal	
Group 6	Medium Sized Contemporary Bath
Group 7	
Group 9	
Kitchen Taps: All	>= 5 Star WELS rating
Bathroom Taps: All	>= 6 Star WELS rating
<b>Dishwashers:</b>	
Group 1	>= 5 Star WELS rating
Group 2	
Group 3	
Group 6	
Group 7	
Group 9	
Group 10	
Retail	Scope out
Communal	
WC: All	>= 4 Star WELS rating
Urinals: All	Scope out

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<b>Washing Machine Water Efficiency:</b>	
Group 1	Default or unrated
Group 2	
Group 3	
Group 6	
Group 7	
Group 9	
Group 10	
Retail	Scope out
Communal	
Which non-potable water source is the dwelling/space connected to?: All	RWT1
Non-potable water source connected to Toilets: All	Yes
Non-potable water source connected to Laundry (washing machine): All	No
Non-potable water source connected to Hot Water System: All	No
<b>Rainwater Tank</b>	
What is the total roof area connected to the rainwater tank?: RWT1	743 m <sup>2</sup>
Tank Size: RWT1	20,000 Litres
Irrigation area connected to tank: RWT1	104 m <sup>2</sup>
Is connected irrigation area a water efficient garden?: RWT1	Yes
Other external water demand connected to tank?: RWT1	-
<b>1.1 Potable water use reduction</b>	40%
Score Contribution	This credit contributes 71.4% towards the category score.
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.
Output	Reference
Project	14195 kL
Output	Proposed (excluding rainwater and recycled water use)
Project	10893 kL
Output	Proposed (including rainwater and recycled water use)
Project	10444 kL
Output	% Reduction in Potable Water Consumption
Project	26 %
Output	% of connected demand met by rainwater
Project	28 %
Output	How often does the tank overflow?
Project	Never / Rarely
Output	Opportunity for additional rainwater connection
Project	4938 kL

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<b>3.1 Water Efficient Landscaping</b>		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
<b>4.1 Building Systems Water Use Reduction</b>		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems?	
Question	Criteria Achieved ?	
Project	Yes	

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**Energy** Overall contribution 15% Minimum required 50%

Use the BESS Deem to Satisfy (DtS) method for Energy?:	Yes
Do all exposed floors and ceilings (forming part of the envelope) demonstrate a minimum 10% improvement in required NCC2019 insulation levels (total R-value upwards and downwards)?:	
Does all wall and glazing demonstrate meeting the required NCC2019 facade calculator (or better than the total allowance)?:	Yes
Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:	Yes
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:	
<b>Dwellings Energy Approach</b>	
What approach do you want to use for Energy?:	Use the built in calculation tools
<b>Project Energy Profile Question</b>	
Are you installing any solar photovoltaic (PV) system(s)?:	Yes
Are you installing any other renewable energy system(s)?:	No
Gas supplied into building:	Natural Gas
Are you installing a cogeneration or trigeneration system?:	No
<b>Dwelling Energy Profiles</b>	
Building: All	B1
Below the floor is:	
Group 1	Another Occupancy
Group 2	
Group 3	
Group 6	
Group 7	
Group 9	Ground or Carpark
Group 10	
Above the ceiling is:	
Group 1	Another Occupancy
Group 2	
Group 3	
Group 9	
Group 10	
Group 6	Outside
Group 7	

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<b>Exposed sides:</b>		
Group 1	1	
Group 9		
Group 2	2	
Group 6		
Group 10		
Group 3	3	
Group 7		
<b>NatHERS Annual Energy Loads - Heat:</b>		
Group 1	61.3 MJ/sqm	
Group 2	66.5 MJ/sqm	
Group 3	85.8 MJ/sqm	
Group 6	98.4 MJ/sqm	
Group 7	118 MJ/sqm	
Group 9	89.5 MJ/sqm	
Group 10	97.7 MJ/sqm	
<b>NatHERS Annual Energy Loads - Cool:</b>		
Group 1	20.1 MJ/sqm	
Group 2	22.5 MJ/sqm	
Group 3	23.7 MJ/sqm	
Group 6	22.8 MJ/sqm	
Group 7	26.6 MJ/sqm	
Group 9	25.3 MJ/sqm	
Group 10	21.2 MJ/sqm	
<b>NatHERS star rating:</b>		
Group 1	6.8	
Group 2	6.5	
Group 3	5.9	
Group 6	5.6	
Group 7	5.0	
Group 9	5.7	
Group 10		
Type of Heating System: All	D Reverse cycle space	
Heating System Efficiency: All	4 Star	
Type of Cooling System: All	Refrigerative space	
Cooling System Efficiency: All	4 Stars	
Type of Hot Water System: All	J Gas Instantaneous 6 star	
Is the hot water system shared by multiple dwellings?: All	Yes	

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<b>% Contribution from solar hot water system:</b>	
Group 1	0 %
Group 2	-
Group 3	
Group 6	
Group 7	
Group 9	
Group 10	
Clothes Line: All	D Private outdoor clothesline
Clothes Dryer: All	Occupant to Install
<b>Non-Residential Building Energy Profile</b>	
Heating, Cooling & Comfort Ventilation - Electricity - reference fabric and reference services: -	
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and reference services: -	
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and proposed services: -	
Heating - Gas - reference fabric and reference services: -	
Heating - Gas - proposed fabric and reference services: -	
Heating - Gas - proposed fabric and proposed services: -	
Heating - Wood - reference fabric and reference services: -	
Heating - Wood - proposed fabric and reference services: -	
Heating - Wood - proposed fabric and proposed services: -	
Hot Water - Electricity - Baseline: -	
Hot Water - Electricity - Proposed: -	
Hot Water - Gas - Baseline: -	
Hot Water - Gas - Proposed: -	
Lighting - Baseline: -	
Lighting - Proposed: -	
Peak Thermal Cooling Load - Baseline: -	
Peak Thermal Cooling Load - Proposed: -	
<b>Solar Photovoltaic systems</b>	
System Size (lesser of inverter and panel capacity):	
PVE	12.5 kW peak
PVW	12.5 kW peak
Orientation (which way is the system facing)?:	
PVE	East
PVW	West
Inclination (angle from horizontal):	
PVE	13.0 Angle (degrees)
PVW	13.0 Angle (degrees)
Which Building Class does this apply to?:	
PVE	Apartment
PVW	Apartment

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<b>1.1 Thermal Performance Rating - Non-Residential</b>		37%
Score Contribution	This credit contributes 2.2% towards the category score.	
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?	
<b>1.2 Thermal Performance Rating - Residential</b>		16%
Score Contribution	This credit contributes 26.8% towards the category score.	
Criteria	What is the average NatHERS rating?	
Output	Average NATHERS Rating (Weighted)	
Apartment	6.5 Stars	
<b>2.1 Greenhouse Gas Emissions</b>		100%
Score Contribution	This credit contributes 9.5% towards the category score.	
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?	
Output	Reference Building with Reference Services (BCA only)	
Apartment	445,519 kg CO2	
Output	Proposed Building with Proposed Services (Actual Building)	
Apartment	174,206 kg CO2	
Output	% Reduction in GHG Emissions	
Apartment	60 %	
<b>2.2 Peak Demand</b>		5%
Score Contribution	This credit contributes 4.7% towards the category score.	
Criteria	What is the % reduction in instantaneous (peak-hour) demand against the benchmark?	
Output	Peak Thermal Cooling Load - Baseline	
Apartment	1,394 kW	
Output	Peak Thermal Cooling Load - Proposed	
Apartment	1,321 kW	
Output	Peak Thermal Cooling Load - % Reduction	
Apartment	5 %	
<b>2.3 Electricity Consumption</b>		100%
Score Contribution	This credit contributes 9.5% towards the category score.	
Criteria	What is the % reduction in annual electricity consumption against the benchmark?	
Output	Reference	
Apartment	366,924 kWh	
Output	Proposed	
Apartment	106,382 kWh	
Output	Improvement	
Apartment	71 %	

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<b>2.4 Gas Consumption</b>		5%
Score Contribution	This credit contributes 9.5% towards the category score.	
Criteria	What is the % reduction in annual gas consumption against the benchmark?	
Output	Reference	
Apartment	1,386,304 MJ	
Output	Proposed	
Apartment	1,278,148 MJ	
Output	Improvement	
Apartment	7 %	
<b>3.1 Carpark Ventilation</b>		100%
Score Contribution	This credit contributes 9.5% towards the category score.	
Criteria	If you have an enclosed carpark, is it: (a) fully naturally ventilated (no mechanical ventilation system) or (b) 40 car spaces or less with Carbon Monoxide monitoring to control the operation and speed of the ventilation fans?	
Question	Criteria Achieved ?	
Project	Yes	
<b>3.2 Hot Water</b>		5%
Score Contribution	This credit contributes 4.7% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?	
Output	Reference	
Apartment	385,084 kWh	
Output	Proposed	
Apartment	368,280 kWh	
Output	Improvement	
Apartment	4 %	
<b>3.4 Clothes Drying</b>		100%
Score Contribution	This credit contributes 4.5% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) from a combination of clothes lines and efficient driers against the benchmark?	
Output	Reference	
Apartment	49,997 kWh	
Output	Proposed	
Apartment	9,999 kWh	
Output	Improvement	
Apartment	80 %	

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<b>3.6 Internal Lighting - Residential Multiple Dwellings</b>		100%
Score Contribution	This credit contributes 8.9% towards the category score.	
Criteria	Is the maximum illumination power density (W/m2) in at least 90% of the relevant building class at least 20% lower than required by Table J6.2a of the NCC 2019 Vol 1 (Class 2-9) and Clause 3.12.5.5 NCC 2019 Vol 2 (Class 1 & 10)?	
Question	Criteria Achieved ?	
Apartment	Yes	
<b>3.7 Internal Lighting - Non-Residential</b>		100%
Score Contribution	This credit contributes 0.6% towards the category score.	
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J6.2a of the NCC 2019 Vol 1?	
Question	Criteria Achieved ?	
Shop	Yes	
Public building	Yes	
<b>4.1 Combined Heat and Power (cogeneration / trigeneration)</b>		N/A  Scoped Out
This credit was scoped out	No cogeneration or trigeneration system in use.	
<b>4.2 Renewable Energy Systems - Solar</b>		94%
Score Contribution	This credit contributes 4.7% towards the category score.	
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?	
Output	Solar Power - Energy Generation per year	
Apartment	27,967 kWh	
Output	% of Building's Energy	
Apartment	6 %	
<b>4.4 Renewable Energy Systems - Other</b>		N/A  Disabled
This credit is disabled	No other (non-solar PV) renewable energy is in use.	

**Stormwater** Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?:		Melbourne Water STORM tool
<b>1.1 Stormwater Treatment</b>		100%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	Has best practice stormwater management been demonstrated?	
Question	STORM score achieved	
Project	108	
Output	Min STORM Score	
Project	100	

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**IEQ** Overall contribution 12% Minimum required 50%

<b>IEQ DTS</b>		
Use the BESS Deemed to Satisfy (DtS) method for IEQ?:		No
<b>Dwellings IEQ Approach</b>		
What approach do you want to use for dwellings?:		Provide our own calculations
<b>1.1 Daylight Access - Living Areas</b>		66%
Score Contribution	This credit contributes 23.0% towards the category score.	
Criteria	What % of living areas achieve a daylight factor greater than 1%	
Question	Percentage Achieved ?	
Apartment	80 %	
<b>1.2 Daylight Access - Bedrooms</b>		66%
Score Contribution	This credit contributes 23.0% towards the category score.	
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%	
Question	Percentage Achieved ?	
Apartment	80 %	
<b>1.3 Winter Sunlight</b>		0%
Score Contribution	This credit contributes 7.7% towards the category score.	
Criteria	Do 70% of dwellings receive at least 3 hours of direct sunlight in all Living areas between 9am and 3pm in mid-winter?	
Question	Criteria Achieved ?	
Apartment	-	
<b>1.4 Daylight Access - Non-Residential</b>		73% <span style="color: green;">✓</span> Achieved
Score Contribution	This credit contributes 2.9% towards the category score.	
Criteria	What % of the regular use floor areas have at least 2% daylight factor?	
Question	Percentage Achieved?	
Shop	60 %	
Public building	79 %	
<b>1.5 Daylight Access - Minimal Internal Bedrooms</b>		100%
Score Contribution	This credit contributes 7.7% towards the category score.	
Criteria	Do at least 90% of dwellings have an external window in all bedrooms?	
Question	Criteria Achieved ?	
Apartment	Yes	
<b>2.1 Effective Natural Ventilation</b>		100%
Score Contribution	This credit contributes 23.0% towards the category score.	
Criteria	What % of dwellings are effectively naturally ventilated?	
Question	Percentage Achieved?	
Apartment	100 %	

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BESS, 8 Louise St Melbourne 3004

<b>2.3 Ventilation - Non-Residential</b>		33%	✓ Achieved
Score Contribution	This credit contributes 2.9% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Shop	-		
Public building	-		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?		
Question	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668:2012?		
Shop	51 %		
Public building	51 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Shop	-		
Public building	-		
<b>3.4 Thermal comfort - Shading - Non-residential</b>		0%	
Score Contribution	This credit contributes 1.4% towards the category score.		
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?		
Question	Percentage Achieved?		
Shop	-		
Public building	-		
<b>3.5 Thermal Comfort - Ceiling Fans - Non-Residential</b>		0%	
Score Contribution	This credit contributes 0.5% towards the category score.		
Criteria	What percentage of regular use areas in tenancies have ceiling fans?		
Question	Percentage Achieved?		
Shop	-		
Public building	-		
<b>4.1 Air Quality - Non-Residential</b>		100%	
Score Contribution	This credit contributes 8.1% towards the category score.		
Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?		
Question	Criteria Achieved ?		
Project	Yes		
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?		
Question	Criteria Achieved ?		
Project	Yes		

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Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Project	Yes

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**Transport** Overall contribution 2%

<b>1.1 Bicycle Parking - Residential</b>		0%
Score Contribution	This credit contributes 18.9% towards the category score.	
Criteria	How many secure and undercover bicycle spaces are there per dwelling for residents?	
Question	Bicycle Spaces Provided ?	
Apartment	62	
Output	Min Bicycle Spaces Required	
Apartment	104	
<b>1.2 Bicycle Parking - Residential Visitor</b>		0%
Score Contribution	This credit contributes 18.9% towards the category score.	
Criteria	How many secure bicycle spaces are there per 5 dwellings for visitors?	
Question	Visitor Bicycle Spaces Provided ?	
Apartment	4	
Output	Min Visitor Bicycle Spaces Required	
Apartment	21	
<b>1.3 Bicycle Parking - Convenience Residential</b>		N/A  Disabled
This credit is disabled	Credit 1.1 must be achieved first.	
<b>1.4 Bicycle Parking - Non-Residential</b>		33%
Score Contribution	This credit contributes 1.2% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Shop	Yes	
Public building	-	
Question	Bicycle Spaces Provided ?	
Shop	10	
Public building	-	
<b>1.5 Bicycle Parking - Non-Residential Visitor</b>		0%
Score Contribution	This credit contributes 0.6% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Shop	No	
Public building	-	
Question	Bicycle Spaces Provided ?	
Shop	0	
Public building	-	
<b>1.6 End of Trip Facilities - Non-Residential</b>		N/A  Disabled
This credit is disabled	Credit 1.4 must be complete first.	

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<b>2.1 Electric Vehicle Infrastructure</b>		100%
Score Contribution	This credit contributes 20.1% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	Yes	
<b>2.2 Car Share Scheme</b>		0%
Score Contribution	This credit contributes 10.1% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	
<b>2.3 Motorbikes / Mopeds</b>		0%
Score Contribution	This credit contributes 20.1% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	-	

**Waste** Overall contribution 2%

<b>1.1 - Construction Waste - Building Re-Use</b>		0%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?	
Question	Criteria Achieved ?	
Project	-	
<b>2.1 - Operational Waste - Food &amp; Garden Waste</b>		0%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are facilities provided for on-site management of food and garden waste?	
Question	Criteria Achieved ?	
Project	-	
<b>2.2 - Operational Waste - Convenience of Recycling</b>		100%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?	
Question	Criteria Achieved ?	
Project	Yes	

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**Urban Ecology** Overall contribution 1%

<b>1.1 Communal Spaces</b>	0%
Score Contribution	This credit contributes 11.2% towards the category score.
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?
Question	Common space provided
Apartment	-
Shop	-
Public building	-
Output	Minimum Common Space Required
Apartment	130 m²
Shop	17 m²
Public building	35 m²
<b>2.1 Vegetation</b>	25%
Score Contribution	This credit contributes 44.7% towards the category score.
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?
Question	Percentage Achieved ?
Project	8 %
<b>2.2 Green Roofs</b>	0%
Score Contribution	This credit contributes 11.2% towards the category score.
Criteria	Does the development incorporate a green roof?
Question	Criteria Achieved ?
Project	No
<b>2.3 Green Walls and Facades</b>	0%
Score Contribution	This credit contributes 11.2% towards the category score.
Criteria	Does the development incorporate a green wall or green façade?
Question	Criteria Achieved ?
Project	No
<b>2.4 Private Open Space - Balcony / Courtyard Ecology</b>	100%
Score Contribution	This credit contributes 10.5% towards the category score.
Criteria	Is there a tap and floor waste on every balcony / in every courtyard?
Question	Criteria Achieved ?
Apartment	Yes

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<b>3.1 Food Production - Residential</b>		0%
Score Contribution	This credit contributes 10.5% towards the category score.	
Criteria	What area of space per resident is dedicated to food production?	
Question	Food Production Area	
Apartment	-	
Output	Min Food Production Area	
Apartment	53 m <sup>2</sup>	
<b>3.2 Food Production - Non-Residential</b>		0%
Score Contribution	This credit contributes 0.7% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Shop	-	
Public building	-	
Output	Min Food Production Area	
Shop	5 m <sup>2</sup>	
Public building	9 m <sup>2</sup>	

**Innovation** Overall contribution 0%

<b>1.1 Innovation</b>	N/A	⊘ Disabled
This credit is disabled	Please enter at least one innovation.	

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## A.1 BESS IEQ compliance + Grouping Input

Apt No.	BESS Apt Group	No. Beds	Cross Ventilation (Note: Ceiling fans installed to Apartments without CV)	Below the floor is	Above the ceiling is	Exposed sides
101	2	2	Y	Another occupancy	Another occupancy	2
102	1	2		Another occupancy	Another occupancy	1
103	1	1		Another occupancy	Another occupancy	1
104	2	2	Y	Another occupancy	Another occupancy	2
105	2	2	Y	Another occupancy	Another occupancy	2
106	9	1		Ground/Carpark	Another occupancy	1
107	10	2	Y	Ground/Carpark	Another occupancy	2
108	9	2	Y	Ground/Carpark	Another occupancy	1
201	2	3	Y	Another occupancy	Another occupancy	2
202	1	2		Another occupancy	Another occupancy	1
203	1	2		Another occupancy	Another occupancy	1
204	2	2	Y	Another occupancy	Another occupancy	2
205	2	2	Y	Another occupancy	Another occupancy	2
206	1	1		Another occupancy	Another occupancy	1
207	2	2	Y	Another occupancy	Another occupancy	2
208	1	2	Y	Another occupancy	Another occupancy	1
301	2	3	Y	Another occupancy	Another occupancy	2
302	1	2		Another occupancy	Another occupancy	1
303	1	2		Another occupancy	Another occupancy	1
304	2	2	Y	Another occupancy	Another occupancy	2
305	2	2	Y	Another occupancy	Another occupancy	2
306	1	1		Another occupancy	Another occupancy	1
307	2	3	Y	Another occupancy	Another occupancy	2
401	2	3	Y	Another occupancy	Another occupancy	2
402	1	2		Another occupancy	Another occupancy	1
403	1	2		Another occupancy	Another occupancy	1
404	2	2	Y	Another occupancy	Another occupancy	2
405	2	2	Y	Another occupancy	Another occupancy	2
406	1	1		Another occupancy	Another occupancy	1
407	2	2	Y	Another occupancy	Another occupancy	2
501	2	3	Y	Another occupancy	Another occupancy	2
502	1	2		Another occupancy	Another occupancy	1
503	1	2		Another occupancy	Another occupancy	1
504	2	2	Y	Another occupancy	Another occupancy	2
505	2	2	Y	Another occupancy	Another occupancy	2
506	1	1		Another occupancy	Another occupancy	1

Apt No.	BESS Apt Group	No. Beds	Cross Ventilation (Note: Ceiling fans installed to Apartments without CV)	Below the floor is	Above the ceiling is	Exposed sides
507	2	2	Y	Another occupancy	Another occupancy	2
601	2	3	Y	Another occupancy	Another occupancy	2
602	1	2		Another occupancy	Another occupancy	1
603	1	2		Another occupancy	Another occupancy	1
604	2	2	Y	Another occupancy	Another occupancy	2
605	2	2	Y	Another occupancy	Another occupancy	2
606	1	1		Another occupancy	Another occupancy	1
607	2	2	Y	Another occupancy	Another occupancy	2
701	2	3	Y	Another occupancy	Another occupancy	2
702	1	2		Another occupancy	Another occupancy	1
703	1	2		Another occupancy	Another occupancy	1
704	2	2	Y	Another occupancy	Another occupancy	2
705	2	2	Y	Another occupancy	Another occupancy	2
706	1	1		Another occupancy	Another occupancy	1
707	2	2	Y	Another occupancy	Another occupancy	2
801	2	3	Y	Another occupancy	Another occupancy	2
802	1	2		Another occupancy	Another occupancy	1
803	1	2		Another occupancy	Another occupancy	1
804	2	2	Y	Another occupancy	Another occupancy	2
805	2	2	Y	Another occupancy	Another occupancy	2
806	1	1		Another occupancy	Another occupancy	1
807	2	2	Y	Another occupancy	Another occupancy	2
901	2	3	Y	Another occupancy	Another occupancy	2
902	1	2		Another occupancy	Another occupancy	1
903	1	2		Another occupancy	Another occupancy	1
904	2	2	Y	Another occupancy	Another occupancy	2
905	2	2	Y	Another occupancy	Another occupancy	2
906	1	1		Another occupancy	Another occupancy	1
907	2	2	Y	Another occupancy	Another occupancy	2
1001	2	3	Y	Another occupancy	Another occupancy	2
1002	1	2		Another occupancy	Another occupancy	1
1003	1	2		Another occupancy	Another occupancy	1
1004	2	2	Y	Another occupancy	Another occupancy	2
1005	2	2	Y	Another occupancy	Another occupancy	2
1006	1	1		Another occupancy	Another occupancy	1
1007	2	2	Y	Another occupancy	Another occupancy	2
1101	2	3	Y	Another occupancy	Another occupancy	2
1102	1	2		Another occupancy	Another occupancy	1
1103	1	2		Another occupancy	Another occupancy	1

Apt No.	BESS Apt Group	No. Beds	Cross Ventilation (Note: Ceiling fans installed to Apartments without CV)	Below the floor is	Above the ceiling is	Exposed sides
1104	2	2	Y	Another occupancy	Another occupancy	2
1105	2	2	Y	Another occupancy	Another occupancy	2
1106	1	1		Another occupancy	Another occupancy	1
1107	2	2	Y	Another occupancy	Another occupancy	2
1201	2	3	Y	Another occupancy	Another occupancy	2
1202	1	2		Another occupancy	Another occupancy	1
1203	1	2		Another occupancy	Another occupancy	1
1204	2	2	Y	Another occupancy	Another occupancy	2
1205	2	2	Y	Another occupancy	Another occupancy	2
1206	1	1		Another occupancy	Another occupancy	1
1207	2	2	Y	Another occupancy	Another occupancy	2
1301	2	3	Y	Another occupancy	Another occupancy	2
1302	1	2		Another occupancy	Another occupancy	1
1303	1	2		Another occupancy	Another occupancy	1
1304	2	2	Y	Another occupancy	Another occupancy	2
1305	2	2	Y	Another occupancy	Another occupancy	2
1306	2	3	Y	Another occupancy	Another occupancy	2
1401	2	3	Y	Another occupancy	Another occupancy	2
1402	1	2		Another occupancy	Another occupancy	1
1403	1	2		Another occupancy	Another occupancy	1
1404	2	2	Y	Another occupancy	Another occupancy	2
1405	2	2	Y	Another occupancy	Another occupancy	2
1406	2	3	Y	Another occupancy	Another occupancy	2
1501	2	4	Y	Another occupancy	Another occupancy	2
1502	2	4	Y	Another occupancy	Another occupancy	2
1503	3	4		Another occupancy	Another occupancy	3
1601	6	4	Y	Another occupancy	Outside	2
1602	6	4	Y	Another occupancy	Outside	2
1603	7	4		Another occupancy	Outside	3
			62			



## Appendix B. Energy Rating Assumptions

### B.1 Building Materials

Element	Description	Added R Value
<b>Floor Type</b>	Suspended concrete slab	
<b>Floor Insulation</b>	50mm Kingspan Kooltherm: Underside of floors shared with car park and outside	<b>R 2.5</b>
<b>Wall Insulation</b>	Lightweight party walls: Insulation R 1.5	<b>R 1.5</b>
	Lightweight corridor walls: Insulation R 1.5	<b>R 1.5</b>
	Precast concrete Lift & stairwell walls: Insulation R1.5	<b>R 1.5</b>
	Precast concrete external walls: Insulation R 2.5	<b>R 2.5</b>
	Exposed Concrete columns: Internally insulated - Insulation R 2.0	<b>R 2.0</b>
	Glass spandrel walls: Insulation R 2.5	<b>R 2.5</b>
<b>Roof Insulation</b>	Concrete roof: R 3.35 insulation	<b>R 3.35</b>
	All apartment concrete ceilings shared with terraces above: R 2.5 insulation	<b>R 2.5</b>
<b>Window Frames</b>	Aluminium frames to all windows and glazed doors	
<b>Spandrel panels</b>	Aluminium thermally broken frames, double glazing plus R1.0 insulation (as NCC 2019 Specification J1.5b (c))	<b>R 1.0</b>
<b>External Blinds</b>	Screens and shading as per elevations	

### NOTES

1. The added insulation R value must be equal to or higher than that specified above to meet the energy rating results.
2. All insulation specified for construction must meet Fire Engineer requirements

## B.2 Glazing

Glazing Type	Whole of Window Value		Location
<b>Capral – 419 Flushline Series Fixed</b>	<b>U</b>	<b>SHGC</b>	
CAP-055-52 Double glazed 6mm Clear/12mm Argon gap/6mm Energy Advantage	2.71	0.58	All Apartments, except East and West Glazing on level 15, 16 and unit 1404
<b>Capral – 35 Series Awning</b>	<b>U</b>	<b>SHGC</b>	
CAP-051-06 Double glazed 6mm Energy Advantage/12mm Argon gap/6mm Clear	4.42	0.41	All Apartments, except East and West Glazing on level 15, 16 and unit 1404
<b>Capral – 900 Series Sliding</b>	<b>U</b>	<b>SHGC</b>	
CAP-057-13 Double glazed 6mm Energy Advantage/12mm Argon gap/6mm Clear	3.19	0.48	All Apartments

Glazing Type		Whole of Window Value		Location
Capral – 419 Flushline Series Fixed		U	SHGC	
Specified Glazing	CAP -059-071 Double Glazed 24mm InsulglassMax 564-Air	2.7	0.26	East and West Glazing on level 15, 16 and unit 1404
Energy rating Software equivalent	CAP-055-50 419 Flushline Double glazed 8.38mm CPGy37/12Argon gap/6mm Clear	2.70	0.26	
Capral – 35 Series Awning Window		U	SHGC	
CAP 051-07 Double Glazed 24mm InsulglassMax 564-Air		4.4	0.20	East and West Glazing on level 15, 16 and unit 1404

### NOTE

The energy rating software accredited by the Australian Building Codes Board contains a relatively limited library of window systems. When the glazing systems specified are not available in the software, the protocol requires that the glazing type which most closely matches the specified glazing is selected for the purpose of calculating the energy rating.

The table above sets out the glazing specified for the purposes of calculating the energy rating.

The whole of window U – Value must be equal or lower than the energy rating software value and the whole of window SHGC – Value must be within +/-5% of the energy rating software value.

### B.3 General Rating Assumptions

Item	Details
<b>Floor Coverings</b>	<ul style="list-style-type: none"> <li>• Tiles to bathrooms and laundries</li> <li>• Carpet to bedrooms</li> <li>• Timber boards to kitchen, living and all other areas</li> </ul>
<b>Window Coverings</b>	<ul style="list-style-type: none"> <li>• Holland blinds to all windows. (Regulation Mode)<sup>1</sup></li> </ul>
<b>Draught Proofing</b>	<ul style="list-style-type: none"> <li>• Weather strips to all entry &amp; external doors and windows.</li> <li>• Seal all exhaust fans.</li> </ul>
<b>Down lights</b>	<ul style="list-style-type: none"> <li>• Recessed down lights in ceiling /roof space to be fitted with fire proof unvented down light covers (external roof areas only) to provide air tightness and contact with insulation</li> </ul>
<b>General</b>	<ul style="list-style-type: none"> <li>• All party walls are classed as neighbour walls.</li> </ul>
<b>Shading</b>	<ul style="list-style-type: none"> <li>• Overshadowing from adjoining buildings has been incorporated into the energy ratings</li> </ul>
<b>Ceiling Calculation</b>	<ul style="list-style-type: none"> <li>• Calculation for loss of ceiling insulation due to down lights, exhaust fans, ceiling speakers etc. have been incorporated into the energy rating where applicable</li> </ul>

### NOTES

1. Changes to any of the above stated specifications may affect energy performance and invalidate the energy ratings detailed in this report.
2. Sealing of gaps and cracks: inadequate sealing of gaps and cracks can negatively affect the energy performance of a dwelling. Provide sealing in accordance with NCC 2019 Part J3.

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<sup>1</sup> Holland blinds are assumed as required by VBA Practice Note 55 (Clause 5.2). This assumption is for regulatory purposes only.

## Appendix C. STORM Report



### STORM Rating Report

TransactionID: 1192853  
 Municipality: PORT PHILLIP  
 Rainfall Station: PORT PHILLIP  
 Address: 8 Louise St  
 Melbourne  
 VIC  
 Assessor: Id  
 Development Type: Residential - Mixed Use  
 Allotment Site (m2): 1,221.00  
 STORM Rating %: 108

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roofs	743.00	Rainwater Tank	20,000.00	100	169.80	81.00
Remaining impervious areas	424.00	None	0.00	0	0.00	0.00

Date Generated: 19-Jul-2021

Program Version: 1.0.0

Architectural site plan of a building with a green roof. The roof is divided into sections with dimensions. A central area is labeled 'CORE' with a staircase. A large green area is labeled 'Rainwater catchment' with text 'Stormwater runoff collected from roof area approx. 743m²'. Other labels include 'NOTE: 112 CONDENSOR UNITS (80% OIL STACKED INSIDE PLANT SCREEN 50mm SINGLE OUTSIDE PLANT SCREEN)', 'LIFT OVERRUN', 'FIRE TANK 1000 x 1000', and 'ANTENNA & MATV ABOVE STAIR CORE'. The plan shows surrounding landscaping, paths, and a fence.

## Appendix D. Rainwater Harvesting

Property  
Version

8 Louise Street, Melbourne

box 1

### Inputs

PPL	100
Flush/Person/Day	5
Litres/Flush	4
Total Daily usage (litres)	2000
Roof area (m2)	743
Collection Evaporation	5%
Tank Capacity (litres)	20,000
Irrigation Area (m2)	104
T'off if Total Rain (mm)	10
in the last	5 days

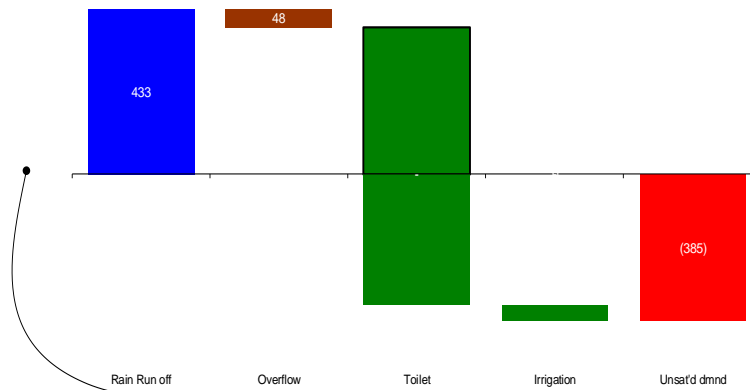
Recalc, update  
pivots, table  
and graphs

### Irrigation Schedule

	L/m2	S	M	T	W	Th	Fr	S
Jan	10		y			y		
Feb	10		y			y		
Mar	10		y			y		
Apr	5		y					
May	5			y				
Jun	5			y				
Jul	5				y			
Aug	5				y			
Sep	5					y		
Oct	5					y		
Nov	10						y	
Dec	10		y				y	

box 2

### System components (kls per year)



box 3

### System components (kls per year) based on 12 years of actual historical daily rainfall (2009 - 2020)

12 years of Averages (2009 - 2020)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Rain Run off	29	30	27	45	37	38	33	38	36	34	47	40	433	
Overflow	(4)	(5)	(4)	(8)	(1)	(3)	(1)	(0)	(2)	(3)	(9)	(8)	(48)	
Rain Water saved	25	25	22	37	36	35	33	37	34	30	38	32	385	
Toilet	(62)	(56)	(62)	(60)	(62)	(60)	(62)	(62)	(60)	(62)	(60)	(62)	(730)	
(Shortfall)/Surplus before Irrigation	(37)	(32)	(40)	(23)	(26)	(25)	(29)	(25)	(26)	(32)	(22)	(29)	(345)	
Irrigation	(7)	(6)	(7)	(2)	(1)	(1)	(2)	(2)	(2)	(1)	(3)	(6)	(40.2)	
Unsatisfied Demand	(44)	(38)	(47)	(25)	(28)	(27)	(31)	(26)	(28)	(33)	(24)	(35)	(385)	

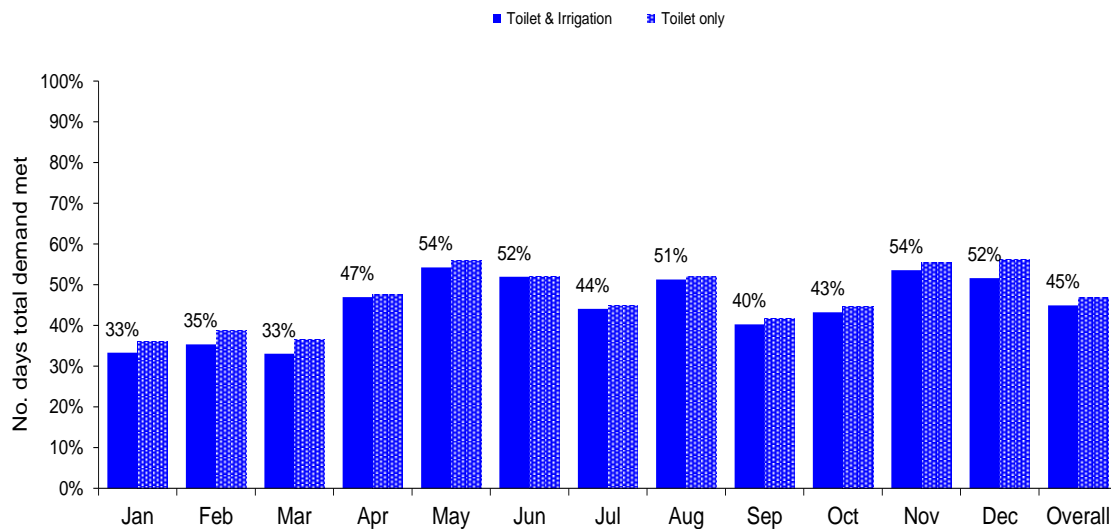
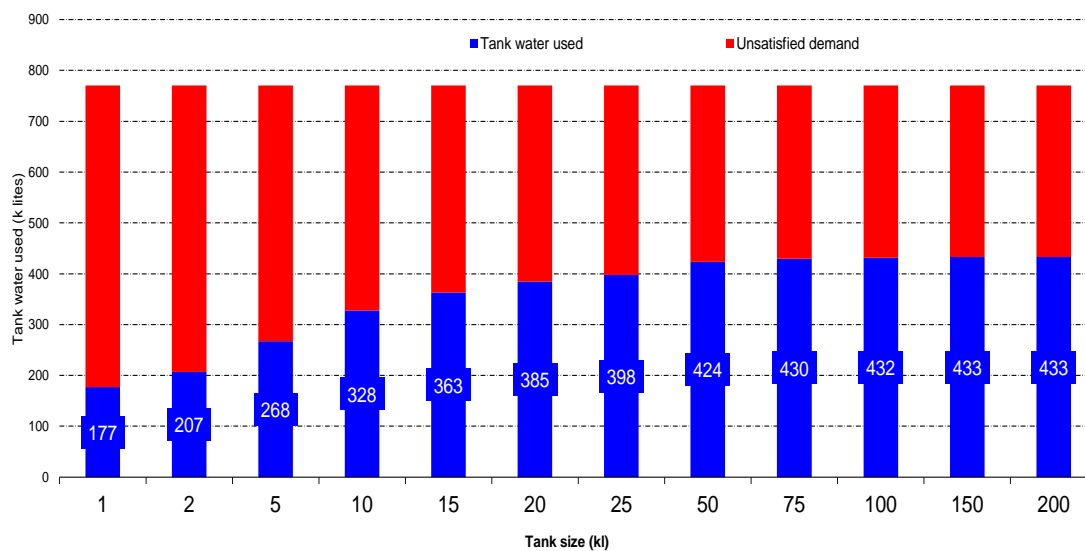
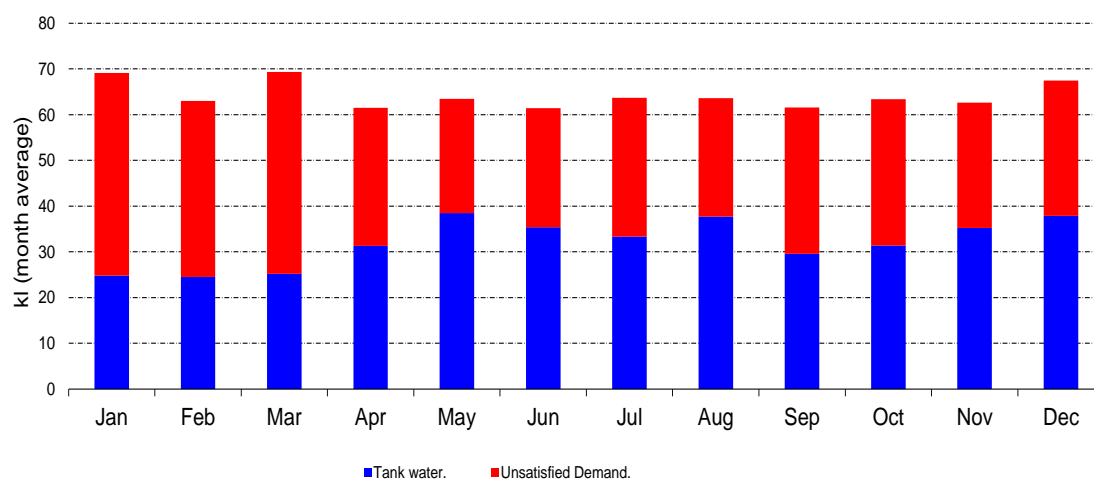
Actual Years														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	
Rain Run off	353	551	547	444	479	335	344	476	441	395	295	538	5,197	
Overflow	(44)	(96)	(133)	(25)	(47)	(12)	(4)	(5)	(59)	(55)	-	(96)	(577)	
Rain Water saved	310	455	413	419	431	323	340	471	381	340	295	442	4,620	
Toilet	(730)	(730)	(730)	(732)	(730)	(730)	(730)	(732)	(730)	(730)	(730)	(728)	(8,762)	
(Shortfall)/Surplus before Irrigation	(420)	(275)	(317)	(313)	(299)	(407)	(390)	(261)	(349)	(390)	(435)	(286)	(4,142)	
Irrigation	(44)	(36)	(37)	(40)	(39)	(42)	(41)	(38)	(39)	(43)	(49)	(34)	(483)	
Unsatisfied Demand	(465)	(311)	(354)	(352)	(338)	(450)	(431)	(300)	(388)	(434)	(484)	(320)	(4,625)	

box 4

### Reliability of supply (daily demand met)- Tank size what ifs

Tank	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall
1k	10%	8%	9%	15%	19%	18%	17%	19%	16%	15%	15%	12%	14%
2k	16%	12%	14%	23%	27%	26%	25%	27%	24%	21%	24%	19%	21%
5k	20%	17%	19%	29%	36%	34%	33%	34%	30%	27%	31%	27%	28%
10k	27%	27%	27%	40%	46%	44%	39%	44%	37%	36%	42%	40%	37%
20k	33%	35%	33%	47%	54%	52%	44%	51%	40%	43%	54%	52%	45%
50k	45%	40%	45%	50%	62%	59%	48%	52%	40%	48%	55%	62%	51%
100k	49%	41%	51%	50%	62%	60%	48%	52%	40%	48%	55%	62%	52%
200k	49%	41%	51%	52%	62%	60%	48%	52%	40%	48%	55%	62%	52%

Graph 2 - Reliability of supply from tank (average across 2009 - 2020)

Graph 3 - Tank water used (per year) V Tank size  
Kls per yearGraph 4 - Tank water used v unsatisfied demand  
by month (kls per month)

## Appendix E. WSUD Maintenance Manual

### Rainwater Harvesting System Maintenance Program

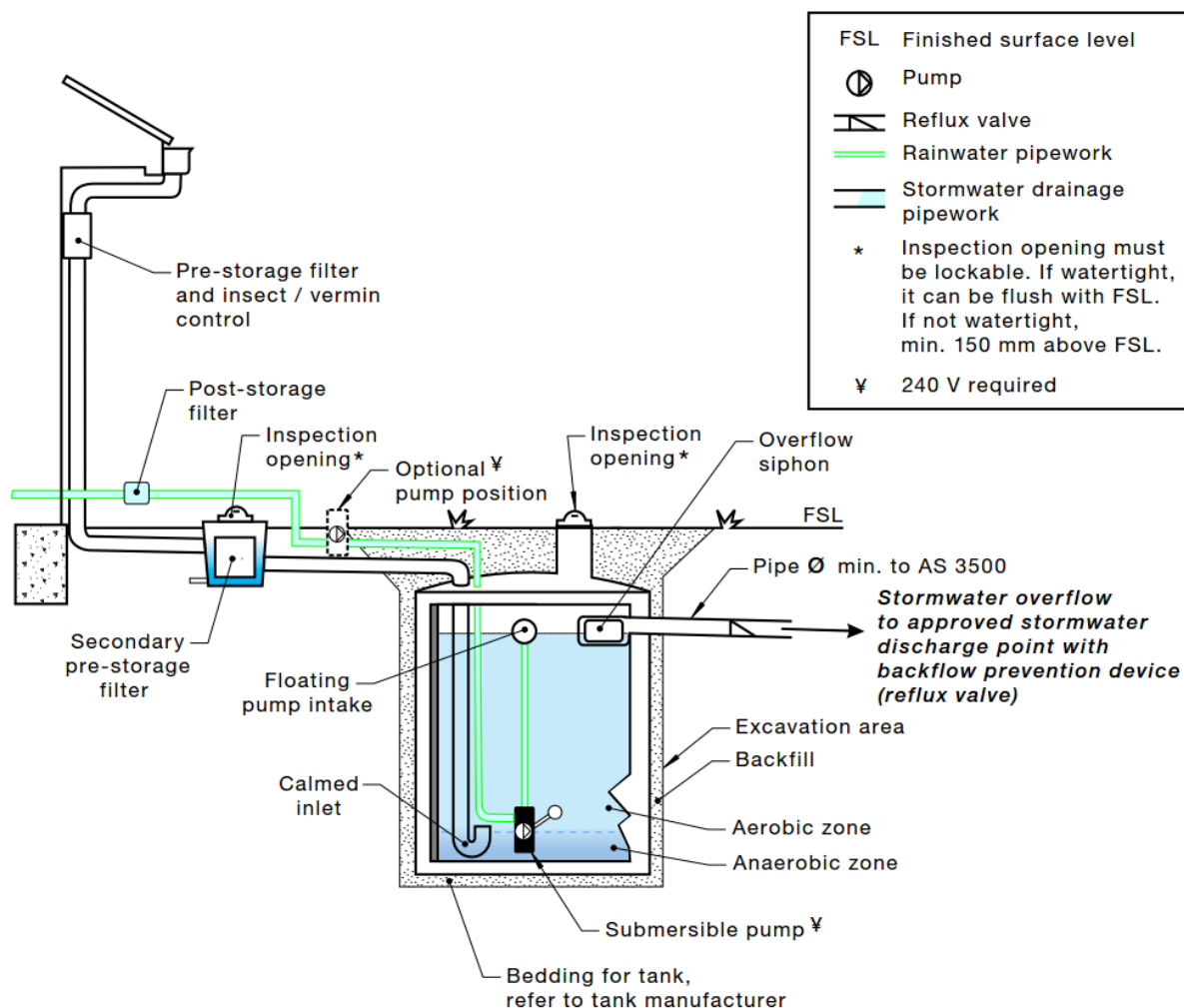
Once installed, a systematic maintenance program will be implemented by the owner's corporation maintenance contractor to ensure the rainwater harvesting system operates as designed and water quality is maintained.

The scope of the maintenance program will include inspection and rectification of issues associated with:

- Roof gutters and downpipes
- First flush screens and filtration devices
- Pumps
- Distribution pipework and reticulation systems
- Overflow systems

Inspections of the system and any maintenance works required will be undertaken on a quarterly basis or as per manufacturers guidelines.

The rainwater harvesting system will be installed in accordance with the guidelines set out in the Rainwater Design & Installation Handbook published by the National Water Commission<sup>2</sup>. A schematic diagram of the rainwater tank installation is provided below.



<sup>2</sup> Rainwater Design & Installation Handbook, National Water Commission, 2006



## E.1 Maintenance Checklist

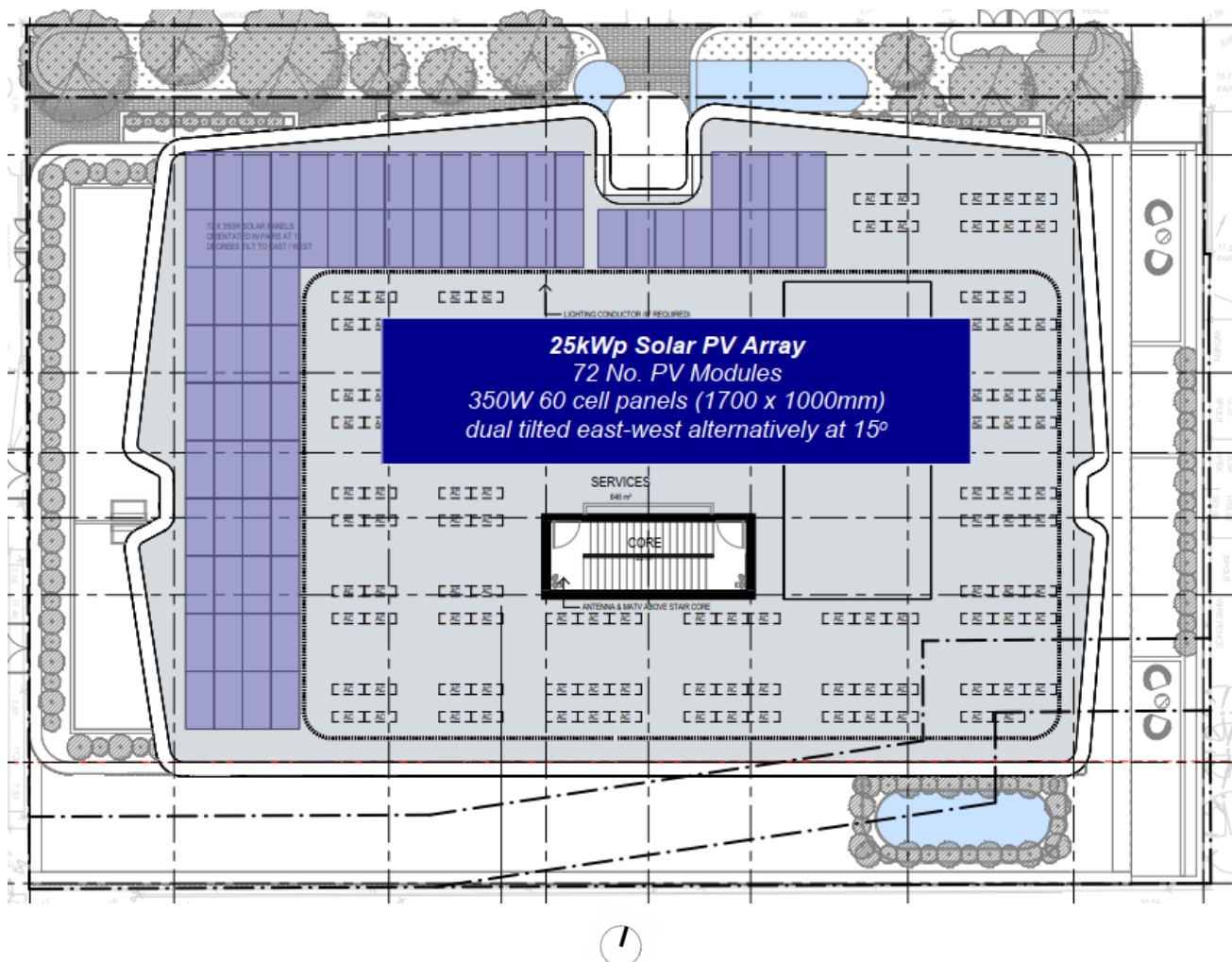
Rainwater Tank Element	Inspection Item	Y/N	Likely Maintenance Task
Roof gutters and downpipes	Is there leaf litter or debris in the gutters?		Remove by hand and dispose responsibly
First flush diverter	Is there anything blocking the first flush diverter (Leaves etc.)?		Remove by hand and dispose responsibly
Potable mains back up device	Is the potable mains back up switch operating correctly?		Repair or replace device. Consider a manual switching device.
Mesh cover	Has the mesh cover deteriorated or have any holes in it?		Replace mesh cover.
Tank volume	Is there large amounts of sediment or debris sitting in the bottom of the tank, reducing the volume available in the tank to store water?		Remove sediment and dispose responsibly.
Pump	Is the pump working effectively? Have you heard it on a regular basis?		Check the potable mains back up is not permanently on. Repair or replace pump.
Pipes and taps	Are pipes and taps leaking?		Repair as needed.
Overflow	Is the overflow clear and connected to the storm water network?		Remove blockages and/or restore connections to stormwater network.

Maintenance Frequency												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All tasks	X			X			X			X		

## Appendix F. Solar Photovoltaic System

High-efficiency solar PV modules with a total capacity of 25 kWp will be installed at roof level as per the preliminary layout indicated below.

PV modules will be oriented in pairs to the east and west at 10-15° tilt and have at least 350Wp capacity (i.e. over 16% more efficient than traditional 300Wp 60-cell modules). High-efficiency modules deliver more compact arrays with inherently lower embodied ecological impact per unit of generation than standard efficiency modules.



Indicative Solar Photovoltaic array layout

The undulating east-west configuration prevents self-shadowing of the array, and provides a low-profile installation with maximised packing factor. It also helps maximise self-consumption due to its flatter and broader power output yield profile.



Total yield of this array will be approximately 35 MWh per annum equating to an estimated annual carbon emissions offset of 39 tonnes CO<sub>2-e</sub> per annum.

### 8 Louise St, Melbourne

#### Photovoltaic System

PV Melbourne energy delivery	MWh/y per kW <sub>e</sub>	1.40	13° tilt, East/West
PV capacity required	kW <sub>e</sub>	25.2	
Proposed PV module rating	W <sub>p</sub>	350	
Efficiency improvement over traditional 300W module		16.7%	
Typical dimensions for 60-cell module	Width (m) x length (m)	1.0 x 1.7	
Number of panels required	rounded up	72	
Expected electricity produced	kWh/day	96.7	
Annual expected electricity produced	MWh/yr	35.3	
Electricity gas emissions factor, NG	kg_CO <sub>2-e</sub> /kWh	1.12	Scope 2 and 3
Greenhouse gas emissions reduction	tonnes_CO <sub>2-e</sub> /yr	39.51	

[2] National Greenhouse Accounts (NGA) Factors, August 2019, table 44 "Latest", "Victoria"

## Appendix G. Site Management Plan

During the construction phase, the key pollutants at risk of entering the stormwater system include:

- Sediments (soil, sand, gravel and concrete washings); and
- Litter, debris etc.

These pollutants arise from factors such as dirt from construction vehicles, stockpiles located close to surface runoff flow paths, and surface runoff from disturbed areas during earthmoving and construction works. It is therefore important to have measures that either prevent or minimise the pollutant loads entering stormwater system during construction.

In order to mitigate the impacts of the above pollutants on the stormwater system, the following stormwater management strategies will be implemented during the construction phase as appropriate:

- Installation of onsite erosion and sediment control measures. All installed control measures shall be regularly inspected & maintained to ensure their effectiveness. Such measures may include (but not limited to):
  - Silt fences
  - sediment traps
  - hay bales
  - geotextile fabrics
- Where possible, litter bins with a lid will be used to prevent litter from getting blown away and potentially entering stormwater drains.

Additionally, the following work practices shall be adopted to reduce stormwater pollution:

- Site induction by the head contractor/ builder to make personnel aware of stormwater management measures in place
- Employ suitable measures to reduce mud being carried off-site into the roadways such as installing a rumble grid/ gravel/ crushed-rock driveway (or equivalent measure) to provide clean access for delivery vehicles, removing mud from vehicle tyres with a shovel etc.
- Safe handling and storage of chemicals, paints, oils and other elements that could wash off site to prevent them from entering stormwater drains.
- Where practicable, stockpiles will be covered, located within the site's fence and away from the lowest point of the site where surface runoff will drain to. This initiative will minimise erosion.

Accordingly, the measures presented above are considered appropriate for the proposed development at this stage of the project. The measures will reduce the pollutants entering stormwater system from the site during construction works thereby protecting waterways.