lid Low Impact Development Consulting

Environmentally Sustainable Design

Sustainable Design Assessment for:

5 Stud Road, Dandenong

Prepared for: Equisent
Prepared by: PM – Low Impact Development Consulting

DATE 17/03/2022

e: info@lidconsulting.com.au
p: 03 9016 9486
a: Suite 7, 252 St Georges Rd, Fitzroy North Vic 3068
w: www.lidconsulting.com.au

Version	Date	Description	Prepared	Checked
1.0	17/03/2022	For issue	PM	CH

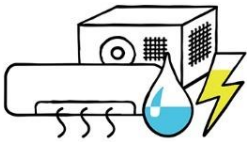
Disclaimer

The content of this document represents the entirety of work output or recommendations offered by LID Consulting for this particular project. This content supersedes all other verbal discussions undertaken by LID Consulting representatives in relation to this project.

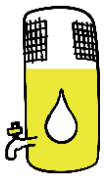
Development highlights

Energy efficient development that meets section J requirements

Energy efficient dwellings that exceed the 6 star energy rating average

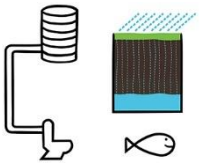


Energy and water efficient heating and cooling

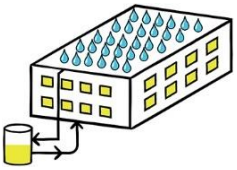


Energy efficient hot water heat pump systems

Energy and water efficient appliances

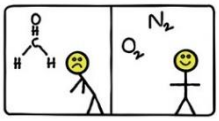


Onsite water use and infiltration - Best Practice Stormwater treatment

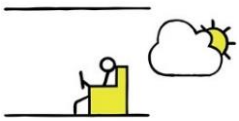


Potable (drinking) water savings – 15,000L Rainwater tank connected to toilets flusing

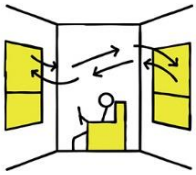
Potable (drinking) water efficient fixtures



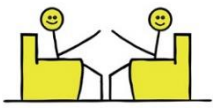
Improved indoor air quality due to reduced use of off-gassing materials



Daylight maximised in regular use areas



All dwellings have cross ventilation



Communal meeting spaces

Environmentally friendly materials choices

Avoidance of use of rainforest timbers

Undercover bicycle parking spots

Separate waste stream and recycling facilities

Contents

LID acknowledges and pays respect to the Australian Aboriginal and Torres Strait Islander people, to their ancestors and elders, past, present and emerging, as the traditional custodians of the lands upon which we work and live. We recognise Aboriginal and Torres Strait Islander people's deep cultural and spiritual relationships to the water, land and sea, and their rich contribution to society.

Executive summary

Project summary

This report addresses the environmentally sustainable development requirements under Clause 22.06 of the City of Greater Dandenong Planning Scheme, demonstrating best practice energy performance, water efficiency, indoor environment quality, stormwater management, sustainable transport, waste management and urban ecology.

This sustainability report details measures that meet and often exceed mandatory Environmentally Sustainable Design (ESD) requirements for this type of development.

The body of the report contains a full list of ESD initiatives to be included in the development. A summary of the major ESD initiatives committed to are included below:

- Net Zero carbon / carbon neutral capability
    - The development will be future proofed and built to enable net zero carbon emissions capability in operation. The project has electricity rather than gas as it's fuel source for all of energy uses: space heating, hot water heating and cooking.
- Energy
    - Energy efficient dwellings that exceed 6-star requirement
    - 10% increase on required NCC2019 insulation levels for floor and roof elements
    - Energy efficient reverse cycle air-conditioning heating and cooling systems beyond minimum standards (within one star of best available)
    - Energy efficient electric heat pump storage hot water units
- Water and Stormwater
    - On-site water uses and infiltration measures to meet CSIRO Best Practice Stormwater Management (Water Sensitive Urban Design) treatment quality requirements
    - Rainwater tank(s) of size 15,000L connected to ground and first floor toilets to reduce potable water consumption and assist with stormwater quality management requirements
    - Potable (drinking) water saving measures including low flow toilets and taps
- Indoor Environment Quality (IEQ) – buildings that help keep occupants healthy
    - Daylight levels assessed to Best Practice standards
    - Reduced indoor pollutants from the use of low off-gassing materials such as low VOC paints, carpets and adhesives, and low formaldehyde products
- Sustainable materials
    - Avoidance of the use of endangered rainforest timbers in this development
    - Use of more environmentally friendly material alternatives for concrete, asphalt, insulation and other building component
- Sustainable transport
    - The development design encourages cycling as it includes substantial, readily accessible bicycle parking
- Urban ecology
    - Light -medium coloured roofing to help mitigate the effects of the Urban Heat Island effect

Generally, other non-mandatory guidelines and good design principles (e.g., Green Star) have also been incorporated where deemed to be relevant in respect to the scope and nature of this development. This encourages further levels of sustainability above and beyond the mandatory requirements.

The proposed development advances basic sustainability principles by increasing the potential use of the site, in line with the surrounding environment. In the context of rising development costs and a need to limit use of material, energy and land resources, the proposed development enables a more affordable and energy efficient model of construction. The expected design life of this development would be in excess of 40 years.

Guidelines and tools addressed in this report as relevant to sustainability include:

- National Construction Code (NCC) / Building Code of Australia (BCA) Volume One Section J;
- Victorian Planning Policy (VPP) and Local Planning Policy (LPP) clauses including
    - 11 Settlement
    - 12 Environmental and Landscape Values
    - 15.02-1S Energy and Resource Efficiency
    - 19.01-2R Renewable Energy – Metropolitan Melbourne
    - 15 Built Environment and Heritage
    - 15.02 Sustainable Development
    - 22.06 Environmentally Sustainable Development
    - 53.18 Stormwater Management in Urban Development
- Built Environment Sustainability Scorecard (BESS); and
- The STORM assessment.

The proposed development will address the relevant ESD requirements of the above planning scheme provisions.

Results summary

Further to the above initiatives and in conjunction with others listed in this report, the development was assessed using the 'Built Environment Sustainability Scorecard' (BESS), obtaining a total score of **52% and passing all mandatory categories.** A score of 50% or greater (including compliance under water, energy, stormwater and IEQ categories) demonstrates a Best Practice environmentally sustainable development.

Commitment & documentation on plans

The "ESD initiatives" in each section can be included in a notes box on the plans, or the report can be referenced in a single note, such as: "The ESD report associated with these plans forms a part of the town planning submission, it is therefore required to be read in conjunction with drawings' notes and specifications, and applied accordingly."

Where applicable, also indicate on the relevant parts of the plans the water tank size and location, raingarden size and location, shading devices, the openable component of a window, air-conditioners condensers, bicycle racks, external materials, solar panels, hot water system type, car park CO sensor and other relevant readily shown items.

Abbreviations used in this report include:

- BCA – Building Code of Australia
- SDAPP – Council Sustainable Design Assessment in the Planning Process
- SDS – Sustainable Design Scorecard
- BESS – Built Environment Sustainability Scorecard

1 Net zero carbon emissions - Carbon neutral energy capability

Goals

- To encourage development that minimises greenhouse gas emissions (cl15.02-1S)

Minimising greenhouse gas emissions means reducing carbon dioxide (carbon) emissions. Actions to minimise emissions can occur during the operation of a building, and also during the construction of that building/development.

Minimised greenhouse gas emissions from operational energy consumed

Net zero carbon/carbon neutrality in operational energy consumption is not difficult to achieve in new developments.

Developments can be built to be net zero carbon/carbon neutral emissions capable in terms of operational energy consumption where the energy source can readily be supplied from a renewable, fossil free fuel source. Electricity is an energy source for buildings that can readily be sourced from renewable energy whether from onsite solar photovoltaic (PV) panels, or offsite solar PV systems or wind via readily accessible GreenPower or carbon neutral energy purchasing. Installing electricity infrastructure ensures building occupants can readily choose when they wish to purchase 100% renewable zero carbon energy.

In addition standard, business as usual purchasing of electricity from the electricity grid is increasingly relying on more renewables for electricity generation. In the last year 32.8% of Victoria's grid electricity came from renewable electricity[1]. By 2025 this will be 40%, and 50% by 2030[2]. All electric services and appliances will automatically become greener due to the greening of the electricity network.

Natural gas on the other hand is methane and produces carbon dioxide when burned in heating, hot water or cooking. While trials are occurring for introducing clean burning hydrogen into our gas network, no clear path is confirmed on how and when all of the network could deliver beyond 10% hydrogen.

Installing gas infrastructure into buildings ties the development to burning a greenhouse gas fuel until the infrastructure is replaced. It is better for the environmentally conscious tenants and future users not to install gas infrastructure at the time of building development.

Carbon neutral energy supply ready	The development will be built to facilitate going net zero carbon emissions in operation. To achieve this, no gas will be included within the development. • Space heating and cooling will be heat pump technology, not gas. • HWS will be electric heat pump with storage tanks • Cooking will be electric induction.	Additional sustainability practice

[1] OpenNEM https://opennem.org.au/energy/vic1/?range=1y&interval=1M 18 Oct 2020-18 Oct 2021.
[2] Victorian Government legislated Renewable Energy (Jobs and Investment) Act 2017 https://www.energy.vic.gov.au/renewable-energy/victorias-renewable-energy-targets

Reduced reliance on fossil fuels	Non-residential areas will reduce their reliance on fossil fuel use: • Space heating and cooling will be heat pump technology, not gas. • HWS will be electric heat pump with storage tanks	Additional sustainability practice

2 Energy Efficiency

Goals

- To improve the efficient use of energy by ensuring the development demonstrates potential for ESD initiatives at the planning stage
- To reduce total operating greenhouse gas emissions
- To reduce energy peak demand through particular design measures (e.g., appropriate building orientation, shading to glazed surfaces, optimise glazing to exposed surfaces, space allocation for solar panels and external heating and cooling

Initiatives

Improved building fabric, heating and cooling, and hot water supply (Non-residential)	The proposed development will achieve improvements on the Deemed to Satisfy (DTS) requirements of NCC 2019 Section J, including: • Meet or exceed total allowance for all wall and glazing with the NCC2019 façade calculator; • 10% improvement on NCC2019 insulation levels (total R-value upwards and downwards) for all exposed floors and ceilings (forming part of the envelope); • Heating and cooling systems within 85% of the best CoP/EER available (or within one star) for the required capacity; and • Water heating systems within one star of the best available, or 85% of the performance of the best available for the required capacity.	BCA Part J, BESS Energy
Energy Rating (Residential)	Current mandatory 6-star average (5 star minimum) energy efficiency requirements for class 2 dwellings will be met or exceeded. The residential part of the development is targeting a 6-star minimum star rating for all dwellings, with preliminary energy ratings indicating the development can achieve an average of 6.6 stars across the project.	SDAPP – Energy efficiency / BESS tool / BCA (Exceeded)

Maximum Cooling and Heating Loads	The proposed development will meet the residential maximum cooling load requirement for the relevant climate zone. This development is located in NatHERS climate zone '62- Moorabbin Airport' with annual load limits as follows: • Cooling limit of 21 MJ/m^2 • Heating limit of 109 MJ/m^2 The maximum cooling and heating loads for the development are 22.2 MJ/m^2 and 92.3 MJ/m^2 respectively, as indicated by the preliminary energy ratings.	BCA/NCC 2019
Building sealing	Building sealing will be to BCA standards including the following or equivalent: compressible foam or similar seals provided around doorways from conditioned to non-conditioned spaces, draft protection devices along the bottom edge of external swing doors, multi-fit cable and pipe seals/adhesive membrane grommets for sealing around pipes or conduits passing through the building envelope, and exhaust fans will have self-closing dampers fitted. Building sealing prevents un-intended heat gain or heat loss.	Part J
Hot water supply	The hot water supply will be from electric heat pump storage units.	SDAPP - Energy efficiency / BESS tool
Heating and cooling	Heating and cooling will be efficient inverter reverse cycle air-conditioners and selected to be within 1 star of the best available system on the market of relevant size/capacity.	SDAPP - Energy efficiency / BESS tool
Energy efficient cooking	Kitchen cooktops will be electric induction type. These are significantly more energy efficient than traditional electric coil or ceramic cooktops as they do not need to heat up an electric coil. Induction cooktops are also more efficient as they heat up much faster than traditional electric cooktops, so they do not need to run as long. Induction cooktops are now readily available at prices competitive with traditional electric cooktops. Gas cooktops burn a fossil fuel which generates carbon emissions. Electric cooktops when powered by 100% renewable energy do not generate carbon emissions.	Additional sustainability practice

<table>
<tr><td></td><td>Hence installing electric cooktops does not lock in use of fossil fuels, but enables this energy use to be carbon neutral when all electricity is from a renewable source (wind, solar PV panels, batteries)</td><td></td></tr>
<tr><td>Windows (Non-residential)</td><td>Windows will be aluminium framed and glazing system as required to meet energy efficiency performance of the NCC2019 façade calculator. See appendix 3.

A preliminary assessment has been undertaken to demonstrate how the proposed building can comply with these Deemed to Satisfy provisions. Note- a Section J - JV3 performance modelling solution may deliver different fabric specifications. This detail will be resolved during detailed design for the purposes of building certification.</td><td>NCC-BCA Section J, NatHERS</td></tr>
<tr><td>Windows (Residential)</td><td>Windows will be energy efficient aluminium framed in accordance with the preliminary energy ratings.

For more details on windows see IEQ section in this report.</td><td>NCC-BCA Section J, NatHERS</td></tr>
<tr><td>Natural ventilation (Non-residential)</td><td>The ventilating areas (i.e., total areas of the openable windows/doors) are minimum 5% of the total floor area of regularly used spaces. This minimises the need of mechanical ventilation.</td><td>BCA Part F4.6 – Additional sustainability practice</td></tr>
<tr><td>Lighting (Non-residential)</td><td>Lighting density throughout the non-residential part of the development will be within the Building Code of Australia (BCA) 2019 maximums. These are significantly lower than BCA 2016 maximums ie:

<table>
<tr><th>Space</th><th>NCC2016 (W/m²)</th><th>NCC2019 (W/m²)</th></tr>
<tr><td>Storage</td><td>8</td><td>1.5</td></tr>
<tr><td>Offices</td><td>7 or 9</td><td>2.5 or 4.5</td></tr>
<tr><td>Carpark</td><td>6</td><td>2</td></tr>
<tr><td>Common areas (eg. corridors)</td><td>8</td><td>5</td></tr>
</table>

The very significant improvement in LED lighting over recent years allows this gain without a loss in illuminance.</td><td>BCA Part J6 – Mandatory</td></tr>
</table>

Lighting (Residential)	Lighting density throughout the development will be reduced to at least 20% below the maximum allowed by the BCA 2019 (e.g. • 4W/m2 rather than 5W/m2 for dwellings • 4W/m2 rather than 5W/m2 for common areas such as corridors). Good LED residential downlights at 6W now provide better lighting output than 50W halogens so generally make this target easy to achieve. Motion sensors will be included in lighting circuits to storerooms and common areas.	BCA Part J6 – Additional sustainability practice
External lighting	External lighting to paths and carparks will have a daylight sensor and either timer or motion sensors installed.	BCA Part J6

Additional Details

Preview energy ratings

The energy efficiency rating of a development is directly affected by the passive solar design characteristics of dwellings which include the orientation of the residences, windows, window sizes, shading of windows; and also, the levels of insulation, window type selected (i.e., single or double glazing with standard or insulated frames) and thermal mass levels within the space. These elements will be combined in such a way to ensure the residences achieve the required 6-star energy efficiency.

A sample of 2 dwelling types (Studio apt and Unit 304 – see appendix 2) indicates that the average energy rating potentially able to be achieved for the dwellings in this development is 6.6 stars. Dwellings were selected to provide a representation of similar or likely lower performing similar dwellings.

Apartment	Number of thermally similar dwellings	Cooling Load (MJ/m²)	Star Rating
OOA studio	2	22.2	6.3
Unit 304	8	16.2	6.6
Total/ weighted average	10	-	6.6

Preview ratings on sampled dwellings indicate that the improved glazing may be required for all dwellings to achieve 6.6 stars average and NCC maximum heating and cooling load allowances. See appendices (to be confirmed when undertaking final certification energy ratings).

Maximum Cooling Loads	The proposed development commits to achieving the maximum cooling load for the climate zone '62 - Moorabbin Airport' of 21MJ/m^2 per annum per clause '55.07-1 Energy Efficiency'. Cooling loads for each dwelling will be assessed during the building certification energy ratings and adjusted as appropriate. Should a reduction in a dwelling cooling load be required there is potential for this development to adapt through the specification of higher performing glazing and/or improved local shading as appropriate. Further information is contained within the appendices.
Heating and cooling	Heating and cooling will be provided by reverse cycle air-conditioner units (which incorporate heat pump technology for the heating component). BESS Energy Efficiency category requires heating and cooling system efficiency to be of the best 15% of available products within a certain size range, or within 1 star of the best available relevant system. Air-conditioners will be reviewed against the following government website to confirm their performance prior to specification. For simple availability checking use the Basic search. https://reg.energyrating.gov.au/comparator/product_types/64/search/
Windows	When selecting a window system, attention must be paid to all components of the system, not just the average thermal values of the glass. Framing material with low thermal conductivity must be selected to ensure the internal surface of the frame remains at a temperature higher than due point of the indoor air in winter.

3 Indoor Environment Quality

Background

Access to daylight and sunshine is advantageous to the wellbeing of humans.

Many paints, adhesives, sealants and flooring types contain Volatile Organic Compounds (VOCs) which are released into the air in our homes and workplaces. Joinery has, over the last 30 years, contained high levels of formaldehyde. VOCs and formaldehyde are recognised as potentially harmful to humans as well as contributors to atmospheric pollution.

Goals

- To achieve a healthy indoor environment quality for the wellbeing of building occupants, including the provision of fresh air intake, cross ventilation and natural daylight.
- To achieve thermal comfort levels with minimised need for mechanical heating, ventilation and cooling.
- To reduce indoor air pollutants by encouraging use of materials with low toxic chemicals levels.
- To minimise noise levels and noise transfer within and between buildings and associated external areas.

Initiatives

Natural ventilation	All windows will meet or exceed BCA minimum 5% room area allowance. The openable component is to be shown on the plans.	BCA requirement
	All primary habitable spaces will be naturally ventilated with doors or openable windows. The ventilating areas (i.e., total areas of the openable windows/doors) are minimum 5% of the total floor area of regularly used spaces. This provides significant energy savings in mechanical ventilation and cooling requirements in warmer weather.	BESS IEQ
	All dwelling habitable room windows will include an openable component.	Additional sustainability practice
	Hinged doors to habitable rooms will have mechanical or magnetic door catches to keep doors open and enable natural (cross)ventilation between rooms.	BESS tool
Daylight (Non-residential)	Daylight levels have been calculated per BESS tool notes using the Green Star Hand Calculation Guide. The ground floor office and first floor MTA's in the development achieve 51% of regular use floor areas with a daylight	BESS tool

	factor of 2%. See Appendix 4 for additional details.	
Daylight (Residential)	Glazing levels will meet the BCA minimum 10% room allowance in all habitable rooms.	NCC-BCA Section F
	There are no saddleback/battle-axe bedrooms included in this development that would prevent daylight getting to half of a room.	Additional sustainability practice
Glare (internal sources)	All bare light sources in non-residential spaces will be managed with baffles, louvres, translucent diffusers, ceiling design or other means that obscures the direct light source from all viewing angles of occupants.	Green Star
Lighting Comfort	Lights installed in the development will be flicker-free.	Green Star
Low VOC products	Light coloured walls internally will help to maximise daylight levels.	Additional sustainability practice
Low formaldehyde products	Engineered wood products (including MDF, particleboard and plywood) will be Class E1 formaldehyde or better. Formaldehyde is used in the production of resins that act as glues for engineered wood products and is a colourless gas with a strong odour. Exposure to formaldehyde can cause irritation in the eyes, nose and throat with various authorities recommend E1 as a maximum emissions class.	Green Star

Additional details

Ventilation paths	Suppliers of mechanical or magnetic door latch stops that can keep doors open include: Gainsborough, Architect and Scope and Bellvue Imports.
Low VOC	Volatile Organic Compounds is the term used to describe several hundred petrochemical solvent type compounds found in paints, adhesives, sealants, carpets, reconstituted wood products, and new furniture. Newer buildings generally have higher concentrations of these VOC's that contribute to headache, lethargy etc. in occupants. **Low VOC paints, adhesives and sealants –** the VOC content of paints, adhesives and sealants will not exceed the levels listed in the table below (VOC limits are less water and exempt compounds) (from the Green Star Design and As Built v1.1 guidelines). Low VOC adhesives and sealants are readily available and can be purchased in bulk to minimise the price premium. Mapei adhesives offer a full low VOC adhesives range

Product category	Maximum VOC content (g/litre)
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One & two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membrane and sealant, fire retardant sealant and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesive and sealants	100

Low VOC paints are readily available at all suppliers:

- Wattyl ID Eco System Low VOC
- Haymes - www.haymespaint.com.au
- Porters Paints - www.porterspaints.com
- Bio Products Aust - www.bioproducts.com.au
- Ecolor - www.ecolour.com.au
- Livos - www.livos.com.au
- Murobond - www.murobond.com.au
- Oikos non-toxic Paints - www.designerpaintco.com
- The Natural Paint Company - www. naturalpaint.com .au

Low formaldehyde products

Reduced formaldehyde emissions in engineered wood products are classed as below:

Class	Limits (mg/L)
Super E0	Less than or equal to 0.3
E0	Less than or equal to 0.5
E1	Less than or equal to 1.0
E2	Less than or equal to 2.0
E3	Greater than 2.0

Companies offering low formaldehyde engineered wood products include:

- Polytec offers E1 and E0.
- Nikpol offers E1, E0 and Super E0 for select products.
- Austral Plywood E1, E0 and Super E0 for select products.
- Laminex Australia offer E1, E0, Super E0 and no added formaldehyde for select products.

4 Water Conservation

Background

As populations increase and global warming contributes to fast climate change, the access to clean potable water will become more of an issue to Australians and the world. Inefficient use of water can lead to the destruction of habitat for dams, over-use of artesian water supplies creating a rising water table or intensive energy use for desalination plants.

Goals

- To ensure the efficient use of water.
- To reduce total operating potable water use.
- To encourage the collection and re-use of stormwater
- To encourage the appropriate use of alternative water sources.
- To minimise associated water costs.

Initiatives

Water efficient fixtures, fittings and appliances	Water efficient fixtures, fittings and appliances have been selected in line with the following WELS ratings: • 4 star shower • 4 star toilets • 5 star bathroom taps • 5 star kitchen taps	BESS, Green Star
Rainwater collection and use	Rainwater collection and use will involve the installation of a rainwater tank of a minimum 15,000L capacity, collecting water from all roof areas and supplying it to all the ground and the first-floor toilets in the development.	STORM, BESS tool, Green Star
Accessibility of pumps	Water pumps and manual over-ride switches will be readily accessible for access in the event of malfunction.	Additional sustainability practice

Additional details

Water efficient fixtures & fittings	All fittings to be specified are based on recommendations from www.savewater.com.au or from the product search on the following site www.waterrating.gov.au and will be amongst the most efficient on the market, and a significant improvement on fittings historically used in most buildings. Traditionally shower heads would use more than 16 litres of water per minute. One star shower heads use between 12 – 16 litres per minute, 2 star shower heads use between 9-12 litres per minute. To reduce this to 6 litres per minute with a 4 star shower head is a significant improvement. Further water efficient appliances will be determined from sources such as the following web site http://www.waterrating.gov.au.

5 Stormwater Management

Background

Pollutants that build up on impervious surfaces get washed into the stormwater system and end up in local waterways. Water Sensitive Urban Design is now a major goal of urban development to prevent this occurring. The quality of water leaving a site (and peak and total stormwater run-off volumes) can be improved by collection of water in water tanks, natural infiltration through gardens and lawns into the soils, and minimisation of impervious pavements or the shedding of water from impervious surfaces into garden beds that have particularly good infiltration into the ground – known as infiltration beds. The following measures have been adopted to ensure these concerns are addressed.

Goals

- To reduce the impact of stormwater run-off
- To improve the quality of stormwater run-off
- To achieve best practice stormwater quality outcomes
- To incorporate the use of water sensitive urban design, including stormwater re-use

Initiatives

Best Practice Stormwater treatment	The following is proposed to achieve 106% of Melbourne Water STORM calculator Best Practice Stormwater treatment goals: • Rainwater shed from roof areas (minimum 673.8m^2) will be collected in a rainwater tank of 15,000L capacity. The rainwater tank will supply water to all the toilets on the ground and the first floor for flushing purposes. • Leaf diverting rain heads and first flush diverters will be included upstream of the tank to divert the initial sediment flow when rain events occur from entering the tank.	STORM, Planning scheme clause 53.18

Additional details

Water sensitive urban design - rainwater tanks	The proposed rainwater tank collection system provides benefits of reducing the peak and total stormwater run-off when it rains. Since the water tanks are connected to all of the toilets, the tank water volumes are run down regularly. This leaves spare capacity to collect new rainfall water and hence reduces the level of rain from the roofs going down the drains. In addition, the pollutants leaving the site to the stormwater system (and hence local creeks) is reduced, by water collected off the roofs, going via the toilets into the sewer system rather than stormwater system as would otherwise have been the case. The final design of the Stormwater system will meet council drainage engineers' requirements. The designed system complies with

Melbourne Water STORM requirements i.e., meets Victorian Best Practice Stormwater guidelines – see appendix 5

6 Material Selection

Background

Careful selection of construction materials can help to limit the environmental impacts of the production, transport and incorporation of these materials in our buildings. In many cases there are similarly performing, comparable but more environmentally friendly product selection options available.

Goals

The goals in environmentally sustainable construction material selection should be to:

- Limit the use of new materials where possible - to help minimise the detrimental outcomes of product manufacture or modification
- Select durable materials and re-use materials where possible – increase the lifespan of all products.
- To minimise the environmental impacts materials used by encouraging the use of materials with a favourable lifecycle assessment based on the fate of materials, their recycling / reuse potential, their embodied energy, their biodiversity, human health, and environmental toxicity impacts.

Initiatives

Greener concrete mixes	Supplementary Cement materials (SCMs)- slag and/or flyash will partially substitute carbon intensive Portland cement in concrete mixes. 20-35% slag and/or flyash or similar geopolymer mixes will be incorporated in on-site on-ground poured structural and paving concrete mixes where vehicles will not be regularly driving over the concrete subject to structural engineers approval.	SDAPP / Green Star
Greener aggregate options	50% recycled aggregate or recycled glass sand will be used as sub-base under paths and or roads subject to design engineer's approval.	Additional sustainability practice
Greener pipe bedding options	100% recycled glass sand will be used for pipe bedding (plumbing pipe, electrical cable etc) In preference to mined virgin sand, subject to the design engineer's approval.	Additional sustainability practice
Light coloured paving	Paving will be light in colour to reduce solar absorption and mitigate the addition to the urban heat island effect. The alternative, dark pavers, would absorb more heat and potentially provides a hotter localised micro-climate on hot days.	Additional sustainability practice

Light coloured roofing	The building roof colour is to be light – medium colour (as per the BCA definitions) rather than dark to help mitigate the effects of the Urban Heat Island effect.	Additional sustainability practice
Sustainable timbers	No unsustainable rainforest timbers will be incorporated i.e., no Oregon, Western Red Cedar, Meranti, Merbau, Teak or Luan.	Green Star
Accredited plantation timber	If proposed, All framing timber will be from accredited plantations - either FSC or PEFC/AFS.	SDAPP / Green Star
Glasswool insulation	Where glasswool insulation is to be used, a product with greater than 50% recycled glass and without the use of formaldehyde as a binder (such as Earthwool or Green Tag certified CSR Bradford Gold batts) will be used.	Additional sustainability practice
Polyester insulation	Where polyester insulation is to be used, products with recycled content will be specified. Polyester insulation is also readily re-useable and if clean is recyclable.	Additional sustainability practice
Carpet underlay	Where carpet is installed, underlay with recycled content will be used under carpets Alternatively, a carpet underlay that is third party GECA certified will be used (e.g. Cloudwalk carpet cushion range).	Additional sustainability practice

Additional details

Greener concrete mixes - Partial cement replacement in concrete	Cement production is the single biggest industrial producer of greenhouse gas generating emissions. Cement production causes 8% of global emissions – more than the global car fleet. (*From page7 of the BZE Rethinking Cement report which references International Energy Agency 2015. Various data sources http://www.iea.org/statistics/*). The industry standard cement type has been Portland cement, for which the raw material is limestone. The first stage of cement making is to transform limestone (calcium carbonate - $CaCO_3$) into lime (CaO), thus releasing carbon dioxide (CO_2) a Greenhouse Gas as a waste product. This single process accounts for about half of the carbon emissions associated with cement making, and therefore around 4% of the world's total emissions. The rest comes from the heat required to drive the production processes and the energy to grind and transport material. Alternative supplementary cementious materials (SCM) concrete mixes have a complying strength, are a similar price and use a reduced amount of high greenhouse gas producing Portland cement when compared with standard cement mixes. They also incorporate

the recycling of industrial waste products such as fly ash and slag and reduce the amount of raw resources required to produce the end product.

Embodied energy levels:

Concrete Product	Embodied carbon TCO_2-e/m^3	Emboddied carbon as a percentage of OPC 32MPA
Generic 32MPA Ordinary Portland Cement	0.481	100%
With 20% flyash	0.397	82.5%
With 20% blast furnace slag	0.404	84.0 %
With 50% flyash	0.273	56.8%
With 50% blast furnace slag	0.288	60.0%
With 100% slag or flyash geopolymer replacement (must be structurally approved. Suitable for some applications)	0.120	25.0%
Holcim EcoPact (lowest non geopolymer we are aware of)	0.198	41.1%
Holcim EcoPact Zero (ECOPact with carbon offset)	0.028	5.8%

Source – The Green Book

Suppliers of geopolymer – Supplementary Cementitious Materials cement:

Company	Product	Contact
Hansen Concrete	Ask for the **Green Star mix**. Common mixes include 30-50% fly ash/slag component	Bob Aldersy 03 9274 3700 Kevin Skilling 9570 3244 Dave Miller 0418 548 321
Boral Concrete	**Envirocrete** **Envirocrete Plus** **Envisia**	Office 13 30 06 Tania Neil 0401 892 027
Barro Concrete	**Triple blend mix** is the fly ash/slag/cement mix - generally has 20-35% fly ash and/or slag	Tom Kovaks 9646 5520 Piero 0438 181 681
Holcim	**ECOPact** Low carbon concrete range offers between 30-60% reduction on embodied carbon. ECOPact ZERO is a full 100% Carbon Neutral product where ECOPact concrete mix is used and emissions are offset with a certified eligible carbon offset	Dylan Viviers 0429 790 600

	through the Climate Active program.

Note Wagners have developed a product called Earth Friendly Concrete (EFC) which uses no Portland cement, just fly ash and slag as the binders. This product has very low embodied energy. We are regularly checking its availability in Melbourne.

Polyester insulation

Polyester insulation is recyclable and generally contain 80% recycled PET bottles. Polyester batts can readily be re-used without handling issues from the fibreglass, and do not disintegrate when wet.

Some companies (eg. Polyester Solutions) will take back clean insulation for recycling at end of life. Batts must not contain metal or other contaminants. Recycling closes the loop for a circular product lifecycle – the ideal sustainability outcome.

Glasswool insulation

Recycled glass used for glasswool manufacture is typically glass that cannot be used in higher grade flat or container glass uses. If using glass based (glasswool/fibreglass) insulation batts the following products which have better environmental characteristics:

- Earthwool by Knauf - Earthwool (Green Tag certified) is made using up to 80% recycled glass and with ECOSE® Technology a sustainable bio-based binder that contains no added formaldehyde or artificial colours or dyes, the brown colour is completely natural.
- CSR Bradford Gold batts (Green Tag certified) made from up to 80% recycled glass.

Carpet underlay

Carpet underlay with significant recycled content (per above) or other environmental benefits will be used.

Suggested recycled underlay products include:

- **Dunlop flooring -** http://www.dunlopflooring.com.au/sustainability/recycle-by-dunlop.asp
- **Airstep carpet underlay -** http://www.airstep.com.au/environmental-overview/recycling/

The Cloudwalk carpet cushion range of underlay is third party GECA certified – it has very low VOC emissions avoids toxic or hazardous chemicals in the manufacturing and the underlays are fully recyclable if the user drops them off at Cloudwalk (TBC if collections also occur in Victoria). Their manufacturing processes are also ISO9001 Quality Management System and ISO14001 Environmental Management System certified.

7 Location and Transport

Goals

- To ensure that the built environment is designed to promote the use of walking, cycling and public transport in that order
- To minimise car dependency
- To promote the use of low emission vehicle technologies and supporting infrastructure

Location

The location of this development meets urban consolidation goals as set out in government policy documents. The development is relatively close to public transport and facilities.

The location achieves a **Walk Score** of 91 which is considered as walkers paradise.

Initiatives

Bicycle parking	As a mixed-use development with the proposed residential areas of less than four storeys, there is no formal planning scheme requirement for bicycle parking. The proposed development is therefore going above planning requirements in providing 10 bicycle parking spaces for its residents.	Planning Scheme clause 52.34 / SDAPP – Transport / BESS
Local public transport information packs	Relevant local train, tram and bus timetables will be included in the Building Users Guide provided. Also included will be brief details of the Melbourne myki public transport payment card system including how to register and load funds against a myki card. Occupants will be alerted to the existence of various public transport smartphone apps such as the Public Transport Victoria app and/or train or tram tracker	SDAPP - Transport
Public transport	The proposed location is serviced by the following public transport options: • Train –1300 metres from the site • Bus – 0 metres from the site These are able to be viewed on the public transport Local Area Map attached in the appendices.	Additional sustainability practice

Additional details

Public transport	Tram, bus and train timetables can be accessed from http://ptv.vic.gov.au/timetables/ A full range of Public Transport Victoria maps can be sourced from http://ptv.vic.gov.au/getting-around/maps/ For more train specific information visit www.metrotrains.com.au A Travel Smart map showing major local travel interchanges can be obtained for the councils listed on the site http://www.transport.vic.gov.au/projects/travelsmart/maps

8 Waste Management

Goals

- To promote waste avoidance, re-use and recycling during the design, construction and operation stages of development.
- To ensure durability and long-term re-usability of building materials.
- To ensure sufficient space is allocated for future change in waste management needs, including (where possible) composting and green waste facilities.

Initiatives

Demolition stage	The developer has committed to ensuring the demolition contractor recycles a minimum of 80% of materials from the existing building to be demolished. The demolition contractor will be required to identify in advance what materials will be recycled, and confirm in writing on company letterhead the percentage of materials by mass actually recycled on completion of works.	SDAPP - Waste
Construction waste	A minimum of 80% of materials will be recycled during construction. Written documentation required from contractor(s) in advance on company letterhead confirming items to be recycled, and on completion, confirmation of percentage of materials recycled.	SDAPP - Waste
Plastering waste	The plastering contractor will be required to supply their own bin and recycle plasterboard off-cuts.	Additional sustainability practice

Separate waste stream collection	Space is allowed for storage of separate garbage and recycling bins and FOGO (food organics and garden organics) bins. Space has been provided for the future provision of a glass recycling bin(s).	SDAPP - Waste

Additional details

Recyclable materials

The following materials can generally be recycled:

- Bricks
- Concrete products (ie. Blocks, roof tiles, pavers etc)
- Unpainted or treated timber
- Steel / metal products
- Glass
- Plasterboard
- Plastics
- Carpet underlay
- Carpet tiles
- Asphalt
- Cardboard
- Green waste

Bin companies or similar that recycle more than others include:

- Jobsite Recyclers. http://www.jobsiterecyclers.com.au/
- Mobius Waste http://www.mobiusmr.com.au/
- Eastern Recycling www.easternrecycling.com.au
- BinGo Industries www.bingoindustries.com.au

Plastering (recycling)

Bins are available from plasterboard recyclers such as ecoGypsum (http://www.ecogypsum.com.au/collections.html) or Sunshine Groupe http://www.sunshinegroupe.com.au/. Alternatively contact recycling companies such as T&L recycling on 0407 867 133 or similar firms.

9 Urban Ecology

Background

Urban development has seen the destruction and displacement of plant species and in turn wildlife habitat. With new developments there is an opportunity to redress this that should be taken up. In all infill development cases there should be an improvement on the current environment.

Goals

- To protect and enhance habitat bio-diversity of the urban environment
- To encourage the retention of significant trees
- To encourage the planting of indigenous vegetation.
- To reduce CO2 in the atmosphere through increased vegetation
- To provide environmentally sustainable landscapes and natural habitats and minimise the urban heat island effect

Initiatives

Indigenous planting	New plantings in the proposed planter boxes will be predominantly indigenous natives.	Additional sustainability practice
Facilitating balcony gardens	A tap will be installed on all balconies to help facilitate watering and maintenance of balcony planting.	Additional sustainability practice
Erosion control	Silt fences, erosion control blankets, and/or drain filters will be utilised during construction to ensure top soil/earth is not eroded to drains and creeks.	Additional sustainability practice
Light coloured roofing	The building roof colour is to be light – medium colour (as per the BCA definitions) rather than dark to help mitigate the effects of the Urban Heat Island effect.	Additional sustainability practice

10 Management, Innovation and Community Benefit

Goals

- To encourage design and innovation in the development, which positively influence the improved life of, and sustainability of, the building.
- To encourage a holistic and integrated design and construction process and ongoing high performance.

Initiatives

Innovation	The following items included in the Materials and IEQ sections demonstrate the proposed development is exceeding Best Practice requirements in these areas: • Commitment to use SCM (partial cement substitutes slag and/or flyash) in concrete • Commitment to use of sustainable timbers (eg. non-rainforest timbers, FCS timbers etc.) • Commitment to low VOC paints, adhesives, sealants. • Commitment to use of low/no formaldehyde products • Commitment to recycling at least 70% of construction waste	BESS tool
Access to Premises – Buildings	The development will comply with the Disability (Access to Premises – Buildings) Standard.	Disability (Access to Premises – Buildings) Standard 2010
Accessible car space	Provision has been made for 2 Accessible car spaces in the development.	Additional practice

Appendix 1 - BESS Report

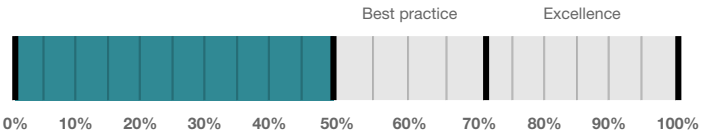
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 5 Stud Rd Dandenong VIC 3175. 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 Greater Dandenong 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	5 Stud Rd Dandenong VIC 3175
Project no	C258A220-R3
BESS Version	BESS-6
Site type	Mixed use development
Account	info@lidconsulting.com.au
Application no.	
Site area	1,195 m²
Building floor area	1,869.0 m²
Date	17 March 2022
Software version	1.7.0-B.378

Performance by category

Category	Weight	Score	Pass
Management	5%	30%	·
Water	9%	50%	✓
Energy	28%	57%	✓
Stormwater	14%	100%	✓
IEQ	17%	68%	✓
Transport	9%	16%	·
Waste	6%	33%	·
Urban Ecology	6%	52%	·
Innovation	9%	0%	·

Buildings

Name	Height	Footprint	% of total footprint
Ground floor- Office	1	312 m²	13%
1st floor- MTA	1	671 m²	28%
2nd and 3rd floors- Apartments	2	1,342 m²	57%

Dwellings & Non Res Spaces

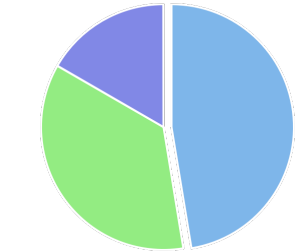
Dwellings

Name	Quantity	Area	Building	% of total area
Apartment				
302,303	2	108 m²	2nd and 3rd floors- Apartments	11%
202,203	2	108 m²	2nd and 3rd floors- Apartments	11%
201,204	2	103 m²	2nd and 3rd floors- Apartments	11%
301,304	2	101 m²	2nd and 3rd floors- Apartments	10%
3f studio	1	23.0 m²	2nd and 3rd floors- Apartments	1%
2f studio	1	23.0 m²	2nd and 3rd floors- Apartments	1%
Total	**10**	**886 m²**	**47%**	

Non-Res Spaces

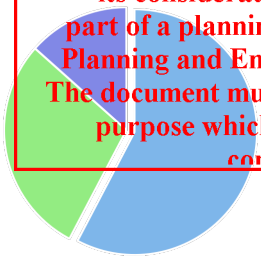
Name	Quantity	Area	Building	% of total area
Office Building				
Ground floor- office	1	312 m²	Ground floor- Office	16%
Total	**1**	**312 m²**	**16%**	
Other building				
1st floor-MTA	1	671 m²	1st floor- MTA	35%
Total	**1**	**671 m²**	**35%**	

Building Type composition



Apartment Other building Office Building

Building composition



2nd and 3rd floors- Apartments 1st floor- MTA Ground floor- Office

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.1	Individual utility meters annotated		-
Water 3.1	Water efficient garden annotated		-
Energy 3.4	Clothes line annotated (if proposed)		-
Stormwater 1.1	Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)		-
IEQ 1.1	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.		-
IEQ 1.2	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.		-
IEQ 1.5	Floor plans with compliant bedrooms marked		-
IEQ 2.1	Dwellings meeting the requirements for being 'naturally ventilated'		-
Transport 1.1	All nominated residential bicycle parking spaces		-
Transport 1.3	Residential bicycle parking spaces at ground level		-
Waste 2.2	Location of recycling facilities		-
Urban Ecology 2.1	Vegetated areas		-
Urban Ecology 2.2	Green roof		-
Urban Ecology 2.4	Taps and floor waste on balconies / courtyards		-

Supporting evidence

Credit	Requirement	Response	Status
Management 2.2	Preliminary NatHERS assessments		-
Management 2.3a	Section J glazing assessment		-
Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Energy 3.6	Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.		-
Energy 3.7	Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.		-
Stormwater 1.1	STORM report or MUSIC model		-

Credit	Requirement	Response	Status
IEQ 1.1	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.		-
IEQ 1.2	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.		-
IEQ 1.4	A short report detailing assumptions used and results achieved.		-
IEQ 1.5	A list of compliant bedrooms		-
IEQ 2.1	A list of naturally ventilated dwellings		-

Credit summary

Management Overall contribution 4.5%

	30%
1.1 Pre-Application Meeting	0%
2.2 Thermal Performance Modelling - Multi-Dwelling Residential	100%
2.3 Thermal Performance Modelling - Non-Residential	50%
3.1 Metering	100%
3.2 Metering	N/A Scoped Out
	Only one tenant/management on site
3.3 Metering	N/A Scoped Out
	Only one tenant/management on site
4.1 Building Users Guide	0%

Water Overall contribution 9.0%

	Minimum required 50%	**50%** ✔ **Pass**
1.1 Potable water use reduction	40%	
3.1 Water Efficient Landscaping	100%	
4.1 Building Systems Water Use Reduction	N/A Scoped Out	

No water based heat rejection systems to be installed. >80% potable water consumption reduction to be achieved for building systems through reticulation of fire safety system test water to sprinkler tanks (test water to be looped back to tanks)

Energy Overall contribution 27.5%

	Minimum required 50%	57%	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		52%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		N/A	Scoped Out
			No gas connection in use
3.1 Carpark Ventilation		N/A	Scoped Out
			Open carpark
3.2 Hot Water		100%	
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		N/A	Disabled
			No solar PV renewable energy is in use.
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%	

IEQ Overall contribution 16.5%

	Minimum required 50%	68%	✔ Pass
1.1 Daylight Access - Living Areas		100%	
1.2 Daylight Access - Bedrooms		100%	
1.3 Winter Sunlight		0%	
1.4 Daylight Access - Non-Residential		39%	✔ Achieved
1.5 Daylight Access - Minimal Internal Bedrooms		100%	
2.1 Effective Natural Ventilation		100%	
2.3 Ventilation - Non-Residential		50%	✔ Achieved
3.4 Thermal comfort - Shading - Non-residential		95%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%	
4.1 Air Quality - Non-Residential		100%	

Transport Overall contribution 9.0%

		16%	
1.1 Bicycle Parking - Residential		100%	
1.2 Bicycle Parking - Residential Visitor		0%	
1.3 Bicycle Parking - Convenience Residential		100%	
1.4 Bicycle Parking - Non-Residential		0%	
1.5 Bicycle Parking - Non-Residential Visitor		0%	
1.6 End of Trip Facilities - Non-Residential		N/A	⊘ Disabled
		Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure		0%	
2.2 Car Share Scheme		0%	
2.3 Motorbikes / Mopeds		0%	

Waste Overall contribution 5.5%

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

Urban Ecology Overall contribution 5.5%

	52%
1.1 Communal Spaces	0%
2.1 Vegetation	75%
2.2 Green Roofs	100%
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	0%

Credit breakdown

Management

Overall contribution 1%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 46.3% 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	
2.2 Thermal Performance Modelling - Multi-Dwelling Residential		100%
Score Contribution	This credit contributes 14.6% towards the category score.	
Criteria	Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings?	
Question	Criteria Achieved ?	
Apartment	Yes	
2.3 Thermal Performance Modelling - Non-Residential		50%
Score Contribution	This credit contributes 16.2% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2019 Section J1.5?	
Question	Criteria Achieved ?	
Office Building	Yes	
Other building	Yes	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2019 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Office Building	No	
Other building	No	
3.1 Metering		100%
Score Contribution	This credit contributes 7.3% towards the category score.	
Criteria	Have utility meters been provided for all individual dwellings?	
Question	Criteria Achieved ?	
Apartment	Yes	
3.2 Metering		N/A Scoped Out
This credit was scoped out	Only one tenant/management on site	
3.3 Metering		N/A Scoped Out
This credit was scoped out	Only one tenant/management on site	

4.1 Building Users Guide		0%
Score Contribution	This credit contributes 15.4% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	No	

Water

Overall contribution 4% Minimum required 50%

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools

Project Water Profile Question	
Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Are you installing a rainwater tank?:	Yes

Water fixtures, fittings and connections	
Building:	
201,204 202,203 2f studio 301,304 302,303 3f studio	2nd and 3rd floors- Apartments
Ground floor- office	Ground floor- Office
1st floor-MTA	1st floor- MTA
Showerhead:	
201,204 202,203 2f studio 301,304 302,303 3f studio 1st floor-MTA	4 Star WELS (>= 6.0 but <= 7.5)
Ground floor- office	Scope out
Bath: All	Scope out
Kitchen Taps: All	>= 5 Star WELS rating
Bathroom Taps: All	>= 5 Star WELS rating
Dishwashers: All	Default or unrated
WC: All	>= 4 Star WELS rating
Urinals: All	Scope out
Washing Machine Water Efficiency:	
201,204 202,203 2f studio 301,304 302,303 3f studio 1st floor-MTA	Default or unrated
Ground floor- office	Scope out
Which non-potable water source is the dwelling/space connected to?: All	RWT
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

Rainwater Tank

What is the total roof area connected to the rainwater tank?: RWT	674 m²
Tank Size: RWT	15,000 Litres
Irrigation area connected to tank: RWT	-
Is connected irrigation area a water efficient garden?: RWT	Yes
Other external water demand connected to tank?: RWT	-

1.1 Potable water use reduction 40%

Score Contribution	This credit contributes 83.3% 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	3397 kL
Output	Proposed (excluding rainwater and recycled water use)
Project	2777 kL
Output	Proposed (including rainwater and recycled water use)
Project	2314 kL
Output	% Reduction in Potable Water Consumption
Project	31 %
Output	% of connected demand met by rainwater
Project	95 %
Output	How often does the tank overflow?
Project	Never / Rarely
Output	Opportunity for additional rainwater connection
Project	1245 kL

3.1 Water Efficient Landscaping 100%

Score Contribution	This credit contributes 16.7% towards the category score.
Criteria	Will water efficient landscaping be installed?
Question	Criteria Achieved ?
Project	Yes

4.1 Building Systems Water Use Reduction N/A ✧ Scoped Out

This credit was scoped out	No water based heat rejection systems to be installed. >80% potable water consumption reduction to be achieved for building systems through reticulation of fire safety system test water to sprinkler tanks (test water to be looped back to tanks)

Energy

Overall contribution 16% 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)?:	Yes
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?:	Yes
Dwellings Energy Approach	
What approach do you want to use for Energy?:	Use the built in calculation tools
Project Energy Profile Question	
Are you installing any solar photovoltaic (PV) system(s)?:	No
Are you installing any other renewable energy system(s)?:	No
Gas supplied into building:	No gas connection
Dwelling Energy Profiles	
Building: All	2nd and 3rd floors- Apartments
Below the floor is: All	Another Occupancy
Above the ceiling is:	
201,204 202,203 2f studio	Another Occupancy
301,304 302,303 3f studio	Outside
Exposed sides:	
201,204 301,304	3
202,203 2f studio 302,303 3f studio	1
NatHERS Annual Energy Loads - Heat:	
201,204 202,203 301,304 302,303	87.2 MJ/sqm
2f studio 3f studio	92.3 MJ/sqm

NatHERS Annual Energy Loads - Cool:	
201,204 202,203 301,304 302,303	16.2 MJ/sqm
2f studio 3f studio	22.2 MJ/sqm
NatHERS star rating:	
201,204 202,203 301,304 302,303	6.6
2f studio 3f studio	
Type of Heating System: All	D Reverse cycle space
Heating System Efficiency: All	3 Star
Type of Cooling System: All	Refrigerative space
Cooling System Efficiency: All	3 Stars
Type of Hot Water System: All	C Electric Heat Pump
% Contribution from solar hot water system: All	-
Is the hot water system shared by multiple dwellings?: All	Yes
Clothes Line: All	F Other permanent indoor in dwelling with 4 metres/bedroom
Clothes Dryer: All	Occupant to Install

Non-Residential Building Energy Profiles	
Heating, Cooling & Comfort Ventilation - Electricity - reference fabric and reference services: All	-
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and reference services: All	-
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and proposed services: All	-
Heating - Wood - reference fabric and reference services: All	-
Heating - Wood - proposed fabric and reference services: All	-
Heating - Wood - proposed fabric and proposed services: All	-
Hot Water - Electricity - Baseline: All	-
Hot Water - Electricity - Proposed: All	-
Lighting - Baseline: All	-
Lighting - Proposed: All	-
Peak Thermal Cooling Load - Baseline: All	-
Peak Thermal Cooling Load - Proposed: All	-

1.1 Thermal Performance Rating - Non-Residential 37%

Score Contribution	This credit contributes 24.0% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?

1.2 Thermal Performance Rating - Residential		16%
Score Contribution	This credit contributes 16.2% towards the category score.	
Criteria	What is the average NatHERS rating?	
Output	Average NATHERS Rating (Weighted)	
Apartment	6.6 Stars	

2.1 Greenhouse Gas Emissions		100%
Score Contribution	This credit contributes 11.4% 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	73,696 kg CO2	
Output	Proposed Building with Proposed Services (Actual Building)	
Apartment	25,166 kg CO2	
Output	% Reduction in GHG Emissions	
Apartment	65 %	

2.2 Peak Demand		52%
Score Contribution	This credit contributes 5.7% towards the category score.	
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?	
Output	Peak Thermal Cooling Load - Baseline	
Apartment	136 kW	
Output	Peak Thermal Cooling Load - Proposed	
Apartment	131 kW	
Output	Peak Thermal Cooling Load - % Reduction	
Apartment	3 %	

2.3 Electricity Consumption		100%
Score Contribution	This credit contributes 11.4% towards the category score.	
Criteria	What is the % reduction in annual electricity consumption against the benchmark?	
Output	Reference	
Apartment	72,251 kWh	
Output	Proposed	
Apartment	24,673 kWh	
Output	Improvement	
Apartment	65 %	

2.4 Gas Consumption		N/A	Scoped Out
This credit was scoped out	No gas connection in use		

3.1 Carpark Ventilation		N/A	Scoped Out
This credit was scoped out	Open carpark		

3.2 Hot Water	100%
Score Contribution	This credit contributes 5.7% 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	28,907 kWh
Output	Proposed
Apartment	11,868 kWh
Output	Improvement
Apartment	58 %

3.4 Clothes Drying	100%
Score Contribution	This credit contributes 2.7% 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	5,109 kWh
Output	Proposed
Apartment	2,043 kWh
Output	Improvement
Apartment	59 %

3.6 Internal Lighting - Residential Multiple Dwellings	100%
Score Contribution	This credit contributes 5.4% 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

3.7 Internal Lighting - Non-Residential	100%
Score Contribution	This credit contributes 6.0% 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 ?
Office Building	Yes
Other building	Yes

4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A	Scoped Out
This credit was scoped out	No cogeneration or trigeneration system in use.	

4.2 Renewable Energy Systems - Solar	N/A	Disabled
This credit is disabled	No solar PV renewable energy is in use.	

4.4 Renewable Energy Systems - Other		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
1.1 Stormwater Treatment	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	106
Output	Min STORM Score
Project	100

IEQ

Overall contribution 11% Minimum required 50%

IEQ DTS	
Use the BESS Deemed to Satisfy (DtS) method for IEQ?:	Yes
Are all living areas and bedrooms less than 8m deep (5m if south facing)?:	Yes
Do all living areas and bedrooms have a floor-to-ceiling height of at least 2.7m?:	Yes
Does all glazing to living areas achieve at least 60% Visible Light Transmittance (VLT)?:	Yes
Do all living areas have an external facing window (not into a courtyard, light well or other major obstruction)? :	Yes
Does the building(s) comply with the requirements of the building separation tables?:	Yes
Dwellings IEQ Approach	
What approach do you want to use for dwellings?:	-

1.1 Daylight Access - Living Areas	100%
Score Contribution	This credit contributes 9.7% towards the category score.
Criteria	What % of living areas achieve a daylight factor greater than 1%
Output	Calculated percentage
Apartment	100 %

1.2 Daylight Access - Bedrooms	100%
Score Contribution	This credit contributes 9.7% towards the category score.
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%
Output	Calculated percentage
Apartment	100 %

1.3 Winter Sunlight	0%
Score Contribution	This credit contributes 3.2% 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	No

1.4 Daylight Access - Non-Residential	39% ✔ Achieved
Score Contribution	This credit contributes 21.6% towards the category score.
Criteria	What % of the nominated floor area has at least 2% daylight factor?
Question	Percentage Achieved?
Office Building	27 %
Other building	57 %

1.5 Daylight Access - Minimal Internal Bedrooms		100%	
Score Contribution	This credit contributes 3.2% towards the category score.		
Criteria	Do at least 90% of dwellings have an external window in all bedrooms?		
Question	Criteria Achieved ?		
Apartment	Yes		

2.1 Effective Natural Ventilation		100%	
Score Contribution	This credit contributes 9.7% towards the category score.		
Criteria	What % of dwellings are effectively naturally ventilated?		
Annotation	All class 2 dwellings have a breeze of of less than 15m with adjacent openings.		
Question	Percentage Achieved?		
Apartment	100 %		

2.3 Ventilation - Non-Residential		50%	✔ Achieved
Score Contribution	This credit contributes 21.6% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Office Building	100 %		
Other building	100 %		
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?		
Office Building	-		
Other building	-		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Office Building	-		
Other building	-		

3.4 Thermal comfort - Shading - Non-residential		95%
Score Contribution	This credit contributes 10.8% towards the category score.	
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?	
Question	Percentage Achieved?	
Office Building	100 %	
Other building	90 %	

3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%
Score Contribution	This credit contributes 3.6% towards the category score.	
Criteria	What percentage of regular use areas in tenancies have ceiling fans?	
Question	Percentage Achieved?	
Office Building	-	
Other building	-	
4.1 Air Quality - Non-Residential		100%
Score Contribution	This credit contributes 6.8% 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	
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?	
Question	Criteria Achieved ?	
Project	Yes	

Transport Overall contribution 2%

1.1 Bicycle Parking - Residential		100%
Score Contribution	This credit contributes 11.2% towards the category score.	
Criteria	How many secure and undercover bicycle spaces are there per dwelling for residents?	
Question	Bicycle Spaces Provided ?	
Apartment	10	
Output	Min Bicycle Spaces Required	
Apartment	10	

1.2 Bicycle Parking - Residential Visitor		0%
Score Contribution	This credit contributes 11.2% towards the category score.	
Criteria	How many secure bicycle spaces are there per 5 dwellings for visitors?	
Question	Visitor Bicycle Spaces Provided ?	
Apartment	-	

1.3 Bicycle Parking - Convenience Residential		100%
Score Contribution	This credit contributes 5.6% towards the category score.	
Criteria	Are bike parking facilities for residents located at ground level?	
Question	Criteria Achieved ?	
Apartment	Yes	

1.4 Bicycle Parking - Non-Residential		0%
Score Contribution	This credit contributes 12.4% 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 ?	
Office Building	No	
Other building	No	
Question	Bicycle Spaces Provided ?	
Office Building	-	
Other building	-	

1.5 Bicycle Parking - Non-Residential Visitor		0%
Score Contribution	This credit contributes 6.2% 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 ?	
Office Building	No	
Other building	No	
Question	Bicycle Spaces Provided ?	
Office Building	-	
Other building	-	

1.6 End of Trip Facilities - Non-Residential		N/A ⊘ Disabled
This credit is disabled	Credit 1.4 must be complete first.	

2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 23.6% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	

2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 11.8% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	

2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 11.8% 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	No	

Waste Overall contribution 2%

1.1 - Construction Waste - Building Re-Use		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	No	

2.1 - Operational Waste - Food & Garden Waste		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	No	

2.2 - Operational Waste - Convenience of Recycling		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	

Urban Ecology

Overall contribution 3%

1.1 Communal Spaces	0%
Score Contribution	This credit contributes 11.8% towards the category score.
Criteria	Is there at least the following amount of common space measured in square meters : * 1m^2 for each of the first 50 occupants * Additional 0.5m^2 for each occupant between 51 and 250 * Additional 0.25m^2 for each occupant above 251?
Question	Common space provided
Apartment	-
Office Building	-
Other building	-
Output	Minimum Common Space Required
Apartment	21 m^2
Office Building	24 m^2
Other building	33 m^2

2.1 Vegetation	75%
Score Contribution	This credit contributes 47.2% 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	22 %

2.2 Green Roofs	100%
Score Contribution	This credit contributes 11.8% towards the category score.
Criteria	Does the development incorporate a green roof?
Annotation	Rooftop has an 87.5 sqm of planter boxes along with the communal dinning/activity area.
Question	Criteria Achieved ?
Project	Yes

2.3 Green Walls and Facades	0%
Score Contribution	This credit contributes 11.8% towards the category score.
Criteria	Does the development incorporate a green wall or green façade?
Question	Criteria Achieved ?
Project	No

2.4 Private Open Space - Balcony / Courtyard Ecology	100%
Score Contribution	This credit contributes 5.6% towards the category score.
Criteria	Is there a tap and floor waste on every balcony / in every courtyard?
Question	Criteria Achieved ?
Apartment	Yes

3.1 Food Production - Residential		0%
Score Contribution	This credit contributes 5.6% 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	6 m²	

3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 6.2% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Office Building	-	
Other building	-	
Output	Min Food Production Area	
Office Building	7 m²	
Other building	9 m²	

Innovation

Overall contribution 0%

1.1 Innovation		0%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?	

Disclaimer

The Built Environment Sustainability Scorecard (BESS) has been provided for the purpose of information and communication. While we make every effort to ensure that material is accurate and up to date (except where denoted as 'archival'), this material does in no way constitute the provision of professional or specific advice. You should seek appropriate, independent, professional advice before acting on any of the areas covered by BESS.

The Municipal Association of Victoria (MAV) and CASBE (Council Alliance for a Sustainable Built Environment) member councils do not guarantee, and accept no legal liability whatsoever arising from or connected to, the accuracy, reliability, currency or completeness of BESS, any material contained on this website or any linked sites.

Appendix 2 - Preliminary Energy Ratings (2nd to 4th floor Units)

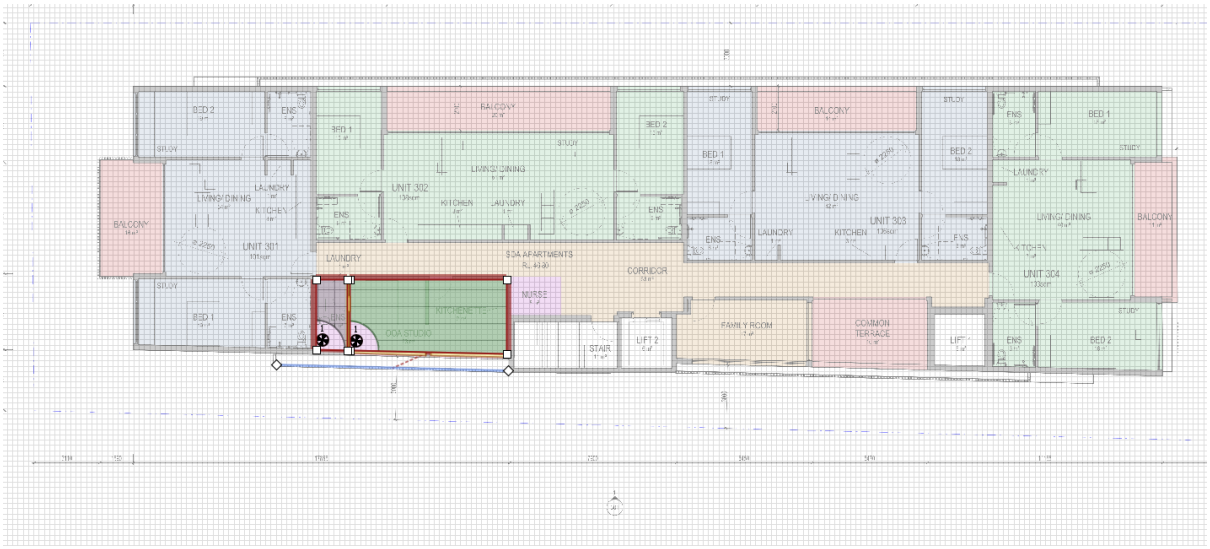
The FirstRate5 preview energy rating for 2nd and 3rd floor apartment units (class 2) unit types OOA studio and Unit 304 incorporates the full list of assumptions as listed below. Note, additional glazing or shading specifications can be incorporated to improve these ratings.

Thermal Group	Dwelling Modelled	No. of similar/better performing dwellings	Heating Load (MJ/m2)	Cooling Load (MJ/m2)	Star Rating
Type 01	OOA studio	2	92.3	22.2	6.3
Type 02	Unit 304	8	87.2	16.2	6.6
			6.6 stars-weighted average		

Full list of assumptions:

- Offset from north point – 8.7 degrees
- Heating and cooling choices when optional - All rooms except as indicated.
- Floor type - suspended slab to all floors
- Floor coverings – carpet to bedrooms, timber to living areas, tiles to wet areas
- Floor insulation – R2.0 under floor above unconditioned areas.
- Ceiling insulation – R4.0 + 1 reflective foil insulation where there is a roof above a unit
- Balcony tile colour - light
- Wall colour – medium
- Wall height to ceiling – Measured floor to ceiling above or confirm if different per plans
- Exterior Walls – Fibre cement with R2.5 internal insulation and 10mm plasterboard over. External cladding where designed.
- Interior walls – R2.0 insulation between condition and unconditioned spaces, R1.5 insulation between party walls
- Windows
    - All window heights as shown in full on elevations
    - Window widths all as per plans
    - Glazing type: Aluminium frame, double-glazed air-filled gap, clear (U-value = 4.8, SHGC=0.59)
    - All windows and doors weather stripped
- Exhaust fans, all sealed –
    - All bathrooms and ensuites: 300mm
    - Kitchen: 180mm
- Ceiling fans – none
- Eaves – included where appropriate
- Wing walls – included where appropriate
- Fences – included where appropriate
- Lights – no unsealed downlights. Max 4W/m2 density. If downlights are installed they will be IC rated downlights with insulation installed over downlight as per manufacturer's recommendations.

OOA Studio apt Report



ADVERTISED PLAN

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	5 Stud Road Dandenong
Accredited Rater	
Date	
Reference	1 Bed Apt- 6.3 Stars

Energy Usage

Type	Energy MJ/m²
Total	114.5
Heating	92.3
Cooling	22.2

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	25.5
Unconditioned Room Area	4.9
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Liv Kit	25.5	kitchen	Y
Ens	4.9	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Concrete block party wall	1.5	0	42.4
Fibre cement	2.5	1	24.1
Internal Plasterboard Stud Wall	2.0	0	9.0

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
300mm concrete slab	0.0	0.0	encl	30.4

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	4.0	0.0	30.4

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	9.86

Window Directions

Direction	Area (m²)
S	9.9

Air leakage

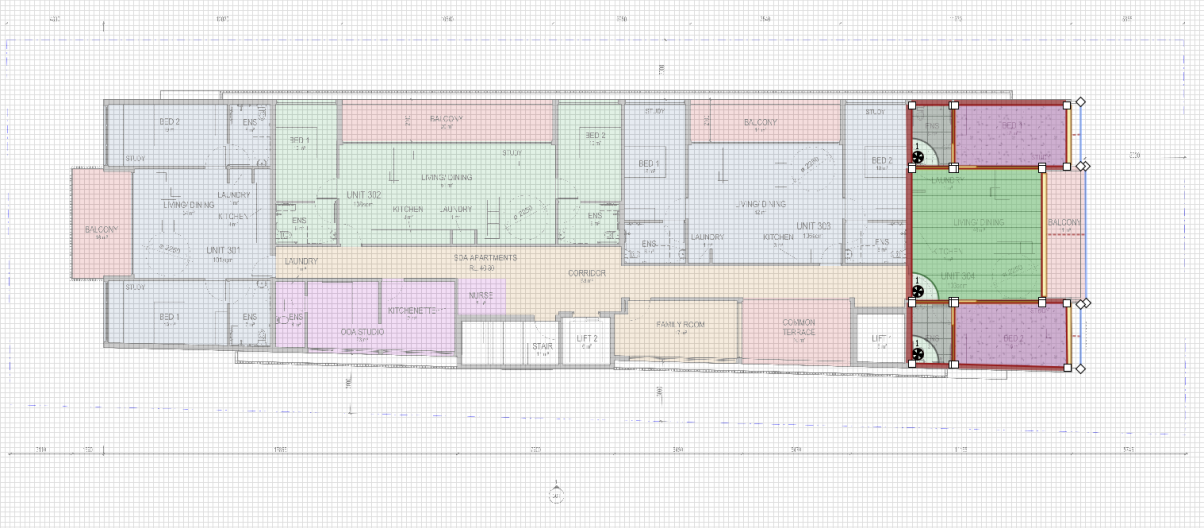
Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Liv Kit (Z001)	99.4	2533.2	23.9	610.2

Provisional Diagnostic Information 08-03-2022 12:55:54 Ver:5.3.2a (3.21) Engine Ver:3.21 Accredited Rater: Assessor's Accreditation Number:

Unit 304 Report



FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	5 Stud Road Dandenong
Accredited Rater	
Date	
Reference	2 Bed Apt- Unit 304- 6.6 stars

Energy Usage

Type	Energy MJ/m²
Total	103.4
Heating	87.2
Cooling	16.2

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	78.7
Unconditioned Room Area	12.4
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Ens1	6.3	unconditioned	N
Bed1	17.4	bedroom	Y
Liv Kit	43.5	kitchen	Y
Ens2	6.1	unconditioned	N
Bed2	17.8	bedroom	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Concrete block party wall	1.5	0	34.4
Fibre cement	2.5	0	83.2
Internal Plasterboard Stud Wall	2.0	0	27.0

Internal Plasterboard Stud Wall	2.0	0	27.6
Internal Plasterboard Stud Wall	0.0	0	23.7

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
300mm concrete slab	0.0	0.0	encl	91.1

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	4.0	0.0	91.1

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	23.44

Window Directions

Direction	Area (m²)
E	23.4

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	3	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bed2 (Z011)	70.8	1260.8	13.0	232.2
Liv Kit (Z004)	117.7	5120.4	21.9	953.4
Bed1 (Z005)	67.1	1165.3	12.6	219.7

Provisional Diagnostic Information 08-03-2022 13:10:42 Ver:5.3.2a (3.21) Engine Ver:3.21 Accredited Rater: Assessor's Accreditation Number:

Appendix 3 - NCC Alternate 2019 Wall-Glazing calculator (Ground floor office and 1st floor medium term accommodation area)

Section J Deemed-to-Satisfy is proposed and the Wall-Glazing Calculator tool below was used to evaluate the walls and glazing properties for the current design for ground level office (Class 5) and 1st level medium term accommodation (Class 3). To achieve deemed to satisfy compliance:

Ground level office (Class 5)

- The walls will need a minimum R value of 1.4 (maximum u-value of 0.71), Any wall system with the R value of R1.4 or higher will comply
- The windows (including the frames) will need a maximum u-value of 7, Any windows with the U value of 7 or lower will comply
- The maximum solar heat gain coefficient (SHGC) needed on proposed glass is 0.34, Any glazing with SHGC of 0.34 or lower will comply

NCC 2019 Wall-Glazing Calculator v3.0

Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification J1.5a, NCC 2019

Building name and description	Classification	Climate Zone
5 Stud rd -Office (GF)	Other	6

Calculated Area-Weighted U-Value	1.55	Calculated Representative Air-Conditioning Energy Value	9.2
Allowable Area-Weighted U-Value	2.00	Allowable Representative Air-Conditioning Energy Value	9.3
Building total U-Value allowance met	78%	Building total SHGC allowance met	100%
Check Values: Not Visible	Wall Element Requirements: Met	Display Glazing Element Requirements	-

Use of this calculator does not guarantee compliance with the NCC. The disclaimer and a version update check are available at the bottom of the page.

	Element Description				U-Value		SHGC and Shading				
ID	Description (optional)	Element Type	Facing Sector	Area (m^2)	U-Value	U-Value Element share of allowance used	SHGC	Glazing Height (m)	Shading Height (m)	Shading Projection (m)	SHGC Element share of allowance used
1	North facade	Wall	North	85.50	0.71	15% of building total					Not counted
2	South façade	Wall	South	83.60	0.71	15% of building total					Not counted
3	East façade	Wall	East	27.11	0.71	5% of building total					Not counted
4	West façade	Wall	West	32.01	0.71	6% of building total					Not counted
5	North glazing	Glazing	North	14.40	7.00	25% of building total	0.34	2.1	3	6.3	0% of building total
6	East glazing	Glazing	East	11.70	7.00	20% of building total	0.34	1.2	2.1	0.8	69% of building total
7	East glazing door	Glazing	East	5.20	7.00	9% of building total	0.34				31% of building total
8	west glazing	Glazing	West	3.90	7.00	7% of building total	0.34	2.4	3	24	0% of building total
9						Not counted					Not counted
10						Not counted					Not counted
11						Not counted					Not counted
12						Not counted					Not counted
13						Not counted					Not counted
14						Not counted					Not counted
15						Not counted					Not counted
16						Not counted					Not counted
17						Not counted					Not counted
18						Not counted					Not counted
19						Not counted					Not counted
20						Not counted					Not counted
21						Not counted					Not counted
22						Not counted					Not counted
23						Not counted					Not counted
24						Not counted					Not counted
25						Not counted					Not counted
26						Not counted					Not counted
27						Not counted					Not counted
28						Not counted					Not counted
29						Not counted					Not counted
30						Not counted					Not counted
31						Not counted					Not counted
32						Not counted					Not counted
33						Not counted					Not counted
34						Not counted					Not counted
35						Not counted					Not counted
36						Not counted					Not counted
37						Not counted					Not counted
38						Not counted					Not counted
39						Not counted					Not counted
40						Not counted					Not counted
41						Not counted					Not counted
42						Not counted					Not counted
43						Not counted					Not counted
44						Not counted					Not counted
45						Not counted					Not counted
46						Not counted					Not counted
47						Not counted					Not counted
48						Not counted					Not counted
49						Not counted					Not counted
50						Not counted					Not counted

Disclaimer:

This calculator has been developed to assist in developing a better understanding of the glazing energy efficiency parameters of NCC 2019. While the author believes that the calculator, if used correctly, is likely to produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of this calculator is entirely at your own risk and the author accepts no liability of any kind.

Made by Alex Zeller

Email alex.wallglazingcalculator@gmail.com with any suggestions for improvement

Check for version update

First level medium term accommodation area (Class 3)

- The walls will need a minimum R value of 2.0 (maximum u-value of 0.5), Any wall system with the R value of R2.0 or higher will comply
- The windows (including the frames) will need a maximum u-value of 3.2, Any windows with the U value of 3.2 or lower will comply
- The maximum solar heat gain coefficient (SHGC) needed on proposed glass is 0.41, Any glazing with SHGC of 0.41 or lower will comply

NCC 2019 Wall-Glazing Calculator v3.0

Wall and glazing energy efficiency in Class 2-9 buildings - Method 2 of Specification J1.5a, NCC 2019

Building name and description	Classification	Climate Zone
5 Stud rd -MTA (1F)	3. 9c or 9a ward	6

Calculated Area-Weighted U-Value	1.09	Calculated Representative Air-Conditioning Energy Value	24.2
Allowable Area-Weighted U-Value	1.10	Allowable Representative Air-Conditioning Energy Value	24.5
Building total U-Value allowance met	99%	Building total SHGC allowance met	99%
Check Values: Not Visible	Wall Element Requirements: Met	Display Glazing Element Requirements	-

Use of this calculator does not guarantee compliance with the NCC. The disclaimer and a version update check are available at the bottom of the page.

	Element Description				U-Value		SHGC and Shading				
ID	Description (optional)	Element Type	Facing Sector	Area (m^2)	U-Value	U-Value Element share of allowance used	SHGC	Glazing Height (m)	Shading Height (m)	Shading Projection (m)	SHGC Element share of allowance used
1	North façade	Wall	North	124.00	0.50	15% of building total					Not counted
2	South façade	Wall	South	123.27	0.50	15% of building total					Not counted
3	East façade	Wall	East	29.33	0.50	3% of building total					Not counted
4	West façade	Wall	West	28.30	0.50	3% of building total					Not counted
5	North glazing	Glazing	North	39.30	3.20	30% of building total	0.41	1.4	1.4	0.5	73% of building total
6	South glazing	Glazing	South	24.60	3.20	19% of building total	0.41	1.4	1.4	0.5	0% of building total
7	East glazing	Glazing	East	4.40	3.20	3% of building total	0.41	1.4	1.4	0.5	7% of building total
8	East glazing-balcony	Glazing	East	7.50	3.20	6% of building total	0.41	2.4	2.4	2.5	6% of building total
9	West glazing	Glazing	West	8.90	3.20	7% of building total	0.41	1.4	1.4	0.5	14% of building total
10						Not counted					Not counted
11						Not counted					Not counted
12						Not counted					Not counted
13						Not counted					Not counted
14						Not counted					Not counted
15						Not counted					Not counted
16						Not counted					Not counted
17						Not counted					Not counted
18						Not counted					Not counted
19						Not counted					Not counted
20						Not counted					Not counted
21						Not counted					Not counted
22						Not counted					Not counted
23						Not counted					Not counted
24						Not counted					Not counted
25						Not counted					Not counted
26						Not counted					Not counted
27						Not counted					Not counted
28						Not counted					Not counted
29						Not counted					Not counted
30						Not counted					Not counted
31						Not counted					Not counted
32						Not counted					Not counted
33						Not counted					Not counted
34						Not counted					Not counted
35						Not counted					Not counted
36						Not counted					Not counted
37						Not counted					Not counted
38						Not counted					Not counted
39						Not counted					Not counted
40						Not counted					Not counted
41						Not counted					Not counted
42						Not counted					Not counted
43						Not counted					Not counted
44						Not counted					Not counted
45						Not counted					Not counted
46						Not counted					Not counted
47						Not counted					Not counted
48						Not counted					Not counted
49						Not counted					Not counted
50						Not counted					Not counted

Disclaimer:

This calculator has been developed to assist in developing a better understanding of the glazing energy efficiency parameters of NCC 2019. While the author believes that the calculator, if used correctly, is likely to produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of this calculator is entirely at your own risk and the author accepts no liability of any kind.

Made by Alex Zeller
Email alex.wallglazingcalculator@gmail.com with any suggestions for improvement

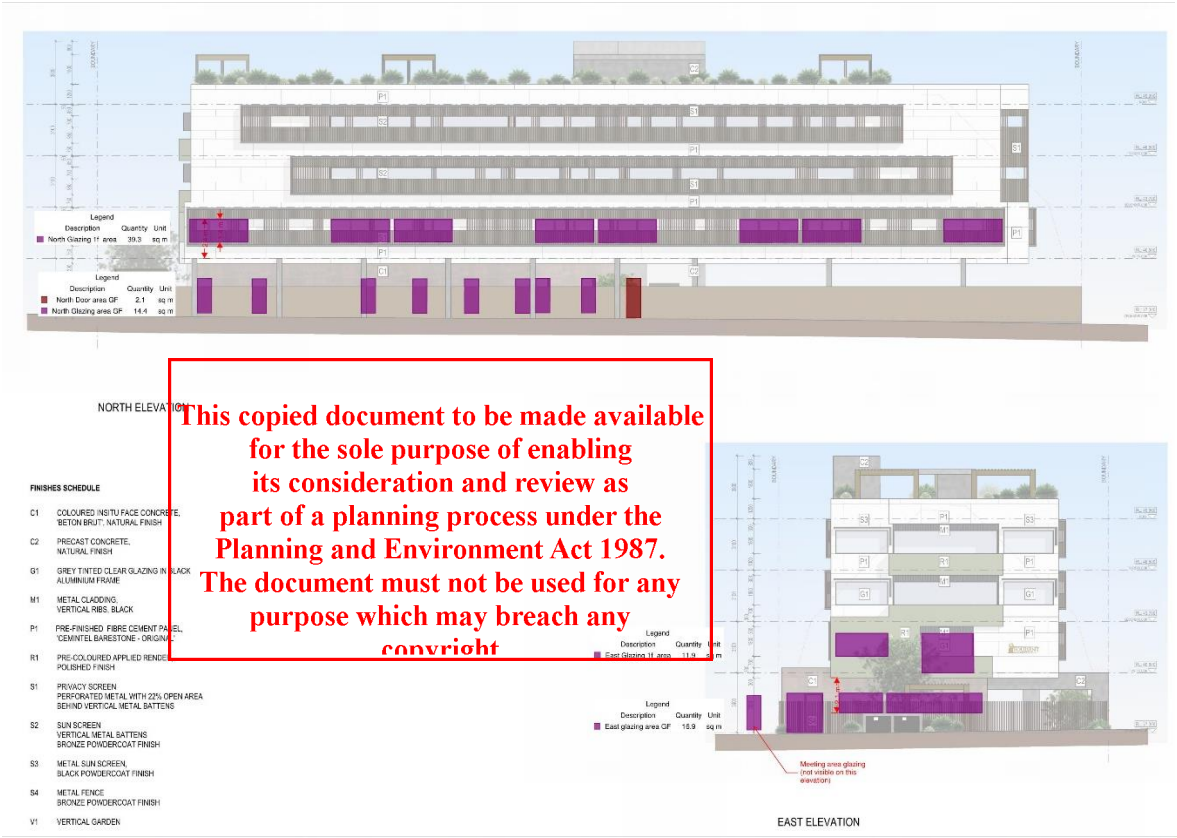
Check for version update

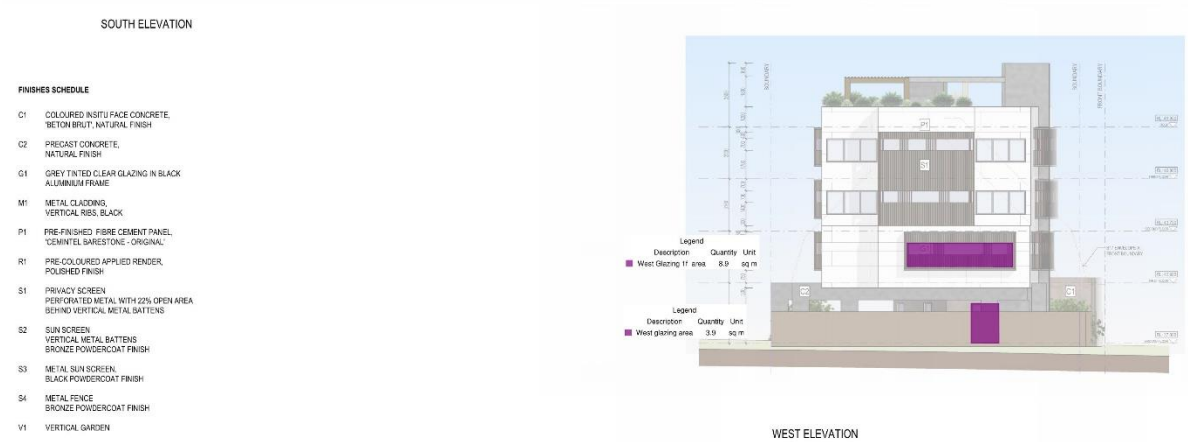
Façade markup for wall glazing calculator

Ground floor- Office external wall measurements to determine the façade areas

First floor- MTA external wall measurements to determine the façade areas

Glazing area markup for wall glazing calcula





Appendix 4 - Daylight Calculations (Greenstar hand calculation)

Daylight summery table

Space	Nominated area (m^2)	Compliant area (m^2)	Compliant area
Ground floor- Office	76.8	21.1	21%
First floor- MTA	244	141.4	58%
Total	**320.8**	**162.5**	**51%**

Ground floor (office) plan-

First floor (MTA) plan-

Appendix 5 - STORM Report

STORM Rating Report

TransactionID:	1340704	
Municipality:	GREATER DANDENONG	
Rainfall Station:	GREATER DANDENONG	
Address:	5 Stud road	
	Dandenong	
	VIC	3175
Assessor:	LID Consulting	
Development Type:	Commercial/Retail	
Allotment Site (m2):	1,195.00	
STORM Rating %:	106	

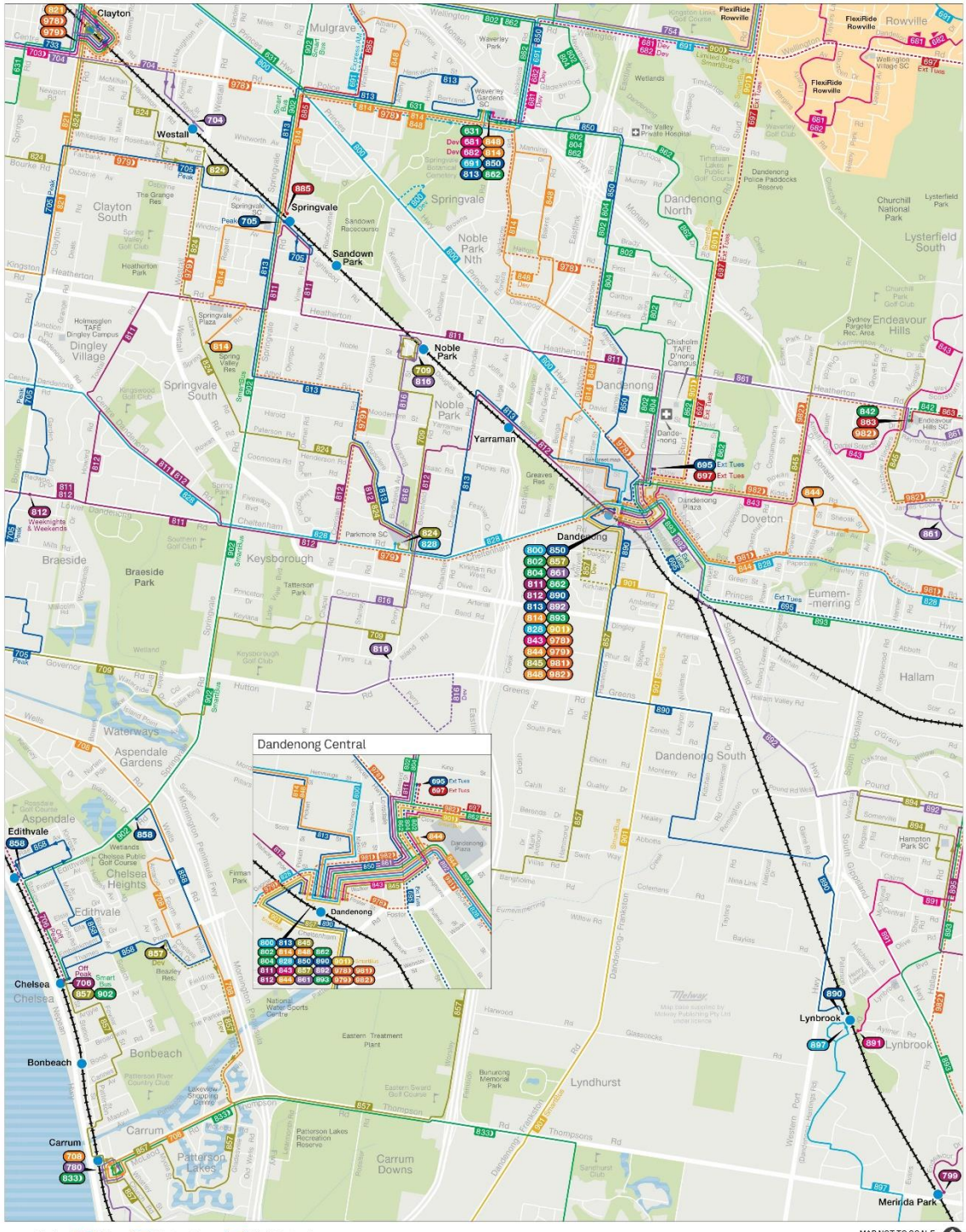
Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof to RWT	673.80	Rainwater Tank	15,000.00	25	152.10	84.60
Impervious roof planters	87.60	None	0.00	0	0.00	0.00
Impervious other areas	203.80	None	0.00	0	0.00	0.00

Date Generated: 17-Mar-2022 Program Version: 1.0.0

Appendix 6 - STORM Area Proof

Appendix 7 - Public Transport Local Area Map

Greater Dandenong bus network



PTVHS690/21

VICTORIA State Government | Department of Transport

For more public transport information visit **ptv.vic.gov.au**, use the **PTV app** or call **1800 800 007**.

Authorised by the Department of Transport, 1 Spring Street, Melbourne

PUBLIC TRANSPORT VICTORIA PT