D23-97813

sustainable built environments
SBE Melbourne
Northbank Place East
Level 1, 525 Flinders St
Melbourne, VIC, 3000
T +61 3 9923 2345
F +61 3 9923 2346

SBE Sydney
Level 6, 61 Market St
Sydney, NSW, 2000
T +61 2 8289 5720
F +61 2 9286 3745

E info@sbe.com.au
W www.sbe.com.au
Sustainable Built Environments Pty Ltd

Environmentally Sustainable Design (ESD) Report

for the

PROPOSED STUDENT ACCOMMODATION

at

1959-1963 Dandenong Road & 75 Beddoe Ave, Clayton

For

Metaxis

CONTENTS

Quality Assurance
Document: Environmentally Sustainable Design (ESD) Report
Date: 26/05/2021
Prepared by: Lakshmee Rajpati and Broderick Jacobs

Revision	Revision Date	Details	Authorised
V1	03/02/2020	18.027 Dandenong Road_200123_Floor Plans_CAD	SMc
V2	26/11/2020	Architectural drawings by Metaxis Architects dated 2nd November 2020	SMc
V3	10/05/2021	Remove courtyard balconies and screens	SMc
V4	26/05/21	Additional bike parks	SMc

1. EXECUTIVE SUMMARY

Sustainable Built Environments (SBE) has been commissioned to provide an Environmentally Sustainable Design (ESD) report for the proposed student accommodation at 1959-1963 Dandenong Road & 75 Beddoe Ave, Clayton.

The aim of the ESD report is to identify and convey the key sustainability opportunities embraced in the design, and provide the Responsible Planning Authority with a clear indication of how the development achieves the City of Monash ESD policy aims and objectives. In particular, this report addresses the requirements outlined in the Monash Planning Scheme Clause 22.13.

SBE has used the Built Environment Sustainability Scorecard (BESS) to benchmark the design's potential ESD performance under each key ESD criteria including: management, water and energy efficiency, stormwater, indoor environment quality (IEQ), sustainable transport, waste, urban ecology, and innovation. Relevant standards included in the Sustainable Design Factsheets published by IMAP have been used to assess ESD criteria not covered by BESS (e.g. Building Materials) but encouraged to be addressed by Council.

The proposed development currently targets 60 points out of 100 in BESS (see extract below), which equates to Best Practice.

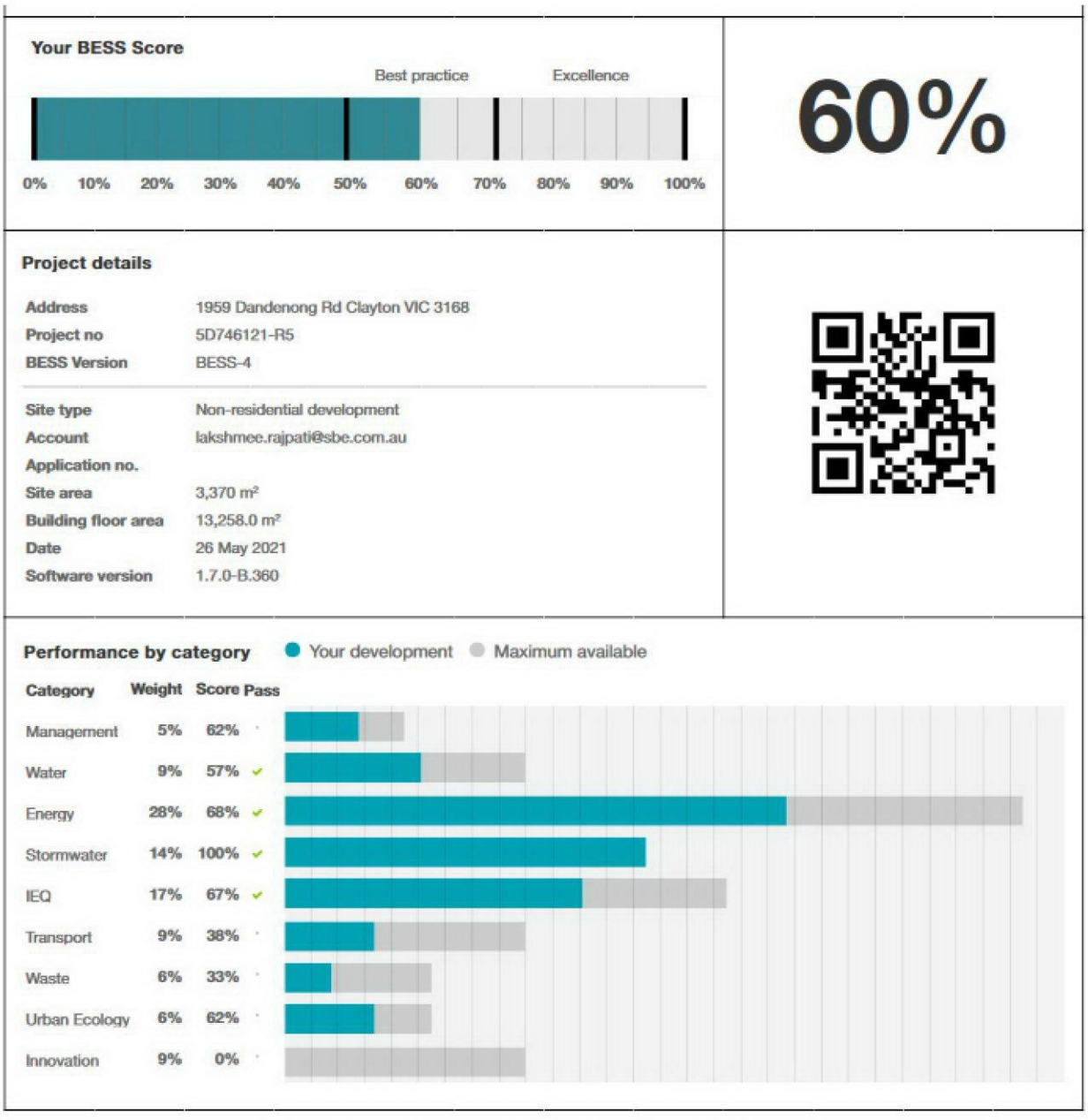

Figure 1 BESS score card. See Appendix F for full report.

2. INTRODUCTION

Sustainable Built Environments (SBE) has been commissioned to provide an Environmentally Sustainable Design (ESD) report for the proposed student accommodation at 1959-1963 Dandenong Road & 75 Beddoe Ave, Clayton.

This Environmentally Sustainable Design (ESD) report developed for Town Planning provides an overview of the key sustainable design initiatives and predicted environmental performance of the proposed development. The report addresses the City of Monash commitment to promoting good ESD outcomes in the built environment and demonstrates how this is being achieved within the project.

2.1 The Project

The project involves the development of seven levels of student accommodation, with 237 lodging rooms plus associated administration and communal spaces, basement carpark and a shop/retail area located on the ground floor.

2.2 Building Class Determination and Requirements

Table 1 below describes Class 2 and Class 3 building definitions as per the NCC[1]. In this regards, the proposed student accommodation has been classified as a Class 3 building.

Building Class	Definition
Class 2	*Class 2 buildings are apartment buildings. They are typically multi-unit residential buildings where people live above and below each other. The NCC describes the space which would be considered the apartment as a sole-occupancy unit (SOU).* *Class 2 buildings may also be single storey attached dwellings where there is a common space below. For example, two dwellings above a common basement or carpark.*
Class 3	*Class 3 buildings are residential buildings other than a Class 1 or Class 2 building. They are a common place of long term or transient living for a number of unrelated people. Examples include a boarding house, guest house, hostel or backpackers (that are larger than the limits for a Class 1b building).* *Class 3 buildings could also include dormitory style accommodation, or workers' quarters for shearers or fruit pickers.* *Class 3 buildings may also be "care-type" facilities such as accommodation buildings for children, the elderly, or people with a disability, and which are not considered to be Class 9 buildings.*

Table 1: Class 2 and Class 3 building definitions as per NCC

Based on the above classification, the building has been assessed within BESS as a Class 3 'other' building. As a consequence, the building nominated area (lodging rooms) should achieve a Daylight Factor (DF) of 2% or more.

2.3 Documents

This report has been informed by the Architectural drawings produced by Metaxis Architects and dated 3rd May 2021.

2.4 City of Monash Planning Requirements

2.4.1. Clause 22.13 ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT (ESD) POLICY

Clause 22.13 of the Monash Planning Scheme calls for a Sustainable Management Plan (SMP) for the project, that outlines the Environmentally Sustainable Design (ESD) initiatives of the development (see table 1 below) and references the use of the BESS[2] tool.

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[1] *National Construction Code*

[2] *Built Environment Sustainability Scorecard*

Type of Development	Application Requirements	Example Tools
dwellings with a gross floor area of more than 1000m².		STORM
Non-residential		
▪ Development of a non-residential building with a gross floor area between and including 500m² and 1000m².	Sustainable Design Assessment (SDA)	BESS MUSIC STORM
▪ Development of a non-residential building with a gross floor area of more than 1000m².	Sustainability Management Plan (SMP)	Green Star BESS MUSIC STORM

Table 2: ESD Application Requirements from Clause 22.13 of the Monash Planning Scheme

2.5 This Report

The following Guides and tools have been used to assess and verify the potential of the design in relation to those Clauses:

- IES VE modelling using the JV3 protocols to test the energy efficiency of the building.
- IES VE modelling using the Flucs DL module to test the daylighting of the building.
- Green star – for guidance and materials, VOCs.
- STORM Modelling to design the WSUD response
- BESS to frame the overall assessment.

3. DESIGN

The ultimate environmental design aim for our built environment is to create buildings that are comfortable, use no energy, no water, that neither produce waste in operation or create waste in their construction, and are made from materials that derive totally from sustainable sources. Although this may not be achievable by all buildings, it nonetheless provides an inspirational goal and an opportunity to consider best practice design solutions.

Environmental Strategy

A sound strategy for reducing the environmental impact of a project is to tackle the design in three ways and in this order of priority:

1. Reduce the demands on active systems in the building by enhancing the passive performance of the building. This includes optimising orientation, shading, insulation, daylighting, ventilation and longevity.
2. Select and specify the most efficient active systems available to satisfy the resultant demands of the building.
3. Offset the resultant energy demands of the building with local or off site mechanisms, for example Photo Voltaic panels or solar hot water.

The above numbered items are also generally in decreasing order of cost effectiveness over the life of the building.

Proposed Design and Site

The proposed development is located within an established neighbourhood and is well connected to public transport and local amenities.

The proposed design has extensive perimeter glazing wherever possible and makes use of large light courts to bring daylight into the heart of the building.

The location consists of student accommodations (class 3) which are much less likely to be occupied during the day and are therefore less reliant on daylighting.

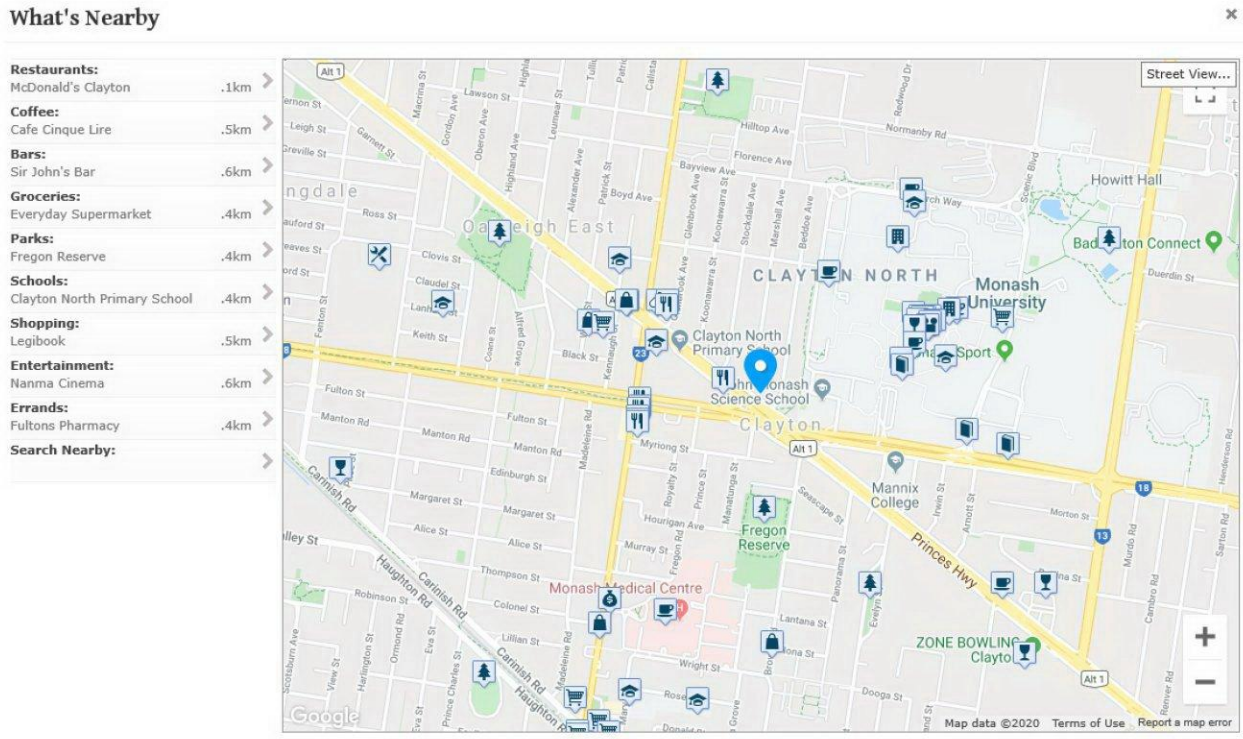


Figure 2 – Location plan for the proposed development

4. MANAGEMENT

It is important to encourage an environmental focus in the management of design, construction and operational phases of the development. The Management category aims to highlight the importance of a holistic and thoroughly integrated approach to constructing and operating a building with good environmental performance.

Management initiatives may include: engaging a professional with a thorough understanding of green building principles; conducting early energy and thermal assessment to help optimise the design, managing construction activities to minimise pollution and maximise soil and air quality protection; enhanced commissioning and tuning of building systems; as well as information management initiatives such as user training and data monitoring.

Management		
Credit	**Aim**	**Design Response/ Project Compliance**
Thermal Performance Modelling	To encourage and recognise developments that have used modelling to inform passive design at the early design stage	Preliminary modelling has been undertaken in accordance with BCA Section J (Energy Efficiency) JV3 protocols, including a Section J DTS glazing calculation to establish the base case (DTS) and an As-Designed (AD) models for the building . For more information on Section J DTS glazing calculations and results for base case (DTS) and an As-Designed (AD) models refer to Appendix A.
Metering	To provide building users with information that allows monitoring of energy and water consumption	The commercial tenancies will be separately metered. All major common area services (e.g. common lighting, car park, exhaust fan, etc.) shall be separately sub-metered. A simple Building User's Guide will be provided to building users.

5. WATER

In Australia, water has long been considered a precious and high-demand resource. Fresh water supplies are increasingly affected by a range of factors including catchment locations, contaminated sources, drought and rising demand. Australia remains the driest inhabited continent in the world with the third largest per capita water consumption rates, and demand for water is close to outstripping supply in many major cities'.

In addition to reducing the demand for water, efficient use of water in buildings can reduce building owners' operational costs. This category aims to minimise the impacts on the environment from extensive water use in the built environment. Demand for potable water can be reduced through recycling from rainwater, greywater and blackwater. Currently, less than ten percent of Australia's sewage is being recycled.

BESS has calculated that the design responses proposed for this development will achieve a 33% reduction in potable water consumption compared to a reference building.

Water		
Credit	**Aim**	**Design Response/ Project Compliance**
Rainwater Tank	To encourage building design that minimises potable water consumption in operations.	Rainwater from the roof area will be captured (40,000L tank), treated and reused for toilet flushing in the lodging rooms as well as the communal laundry.
Building Systems Water Use Reduction		No water based cooling will be used in the building. Fire test water will be captured for reuse in the building for irrigation[3]. A 2,000L tank will be provided. Water collected from systems such air conditioning and fire sprinklers must be recycled for other purposes such as irrigation. Documentation of floor plans with collection tank capacity and intended re-use must be provided. (Ref: VBA Practice Note 61-2018 - Water Savings Options Available when testing Fire Safety Systems)
Sanitary Fixture Efficiency		All sanitary fixtures shall have the WELS rating stated below: • Kitchen Taps – 5 Stars • Bathroom Taps – 6 Stars • Toilets – 4 Stars • Showers – 3 Stars (>6.0 but <=7.5) • Washing Machine (located in communal laundry rooms) – 5 Stars • Rainwater flushing to WCs and communal laundry
Water Efficient Landscaping		Water efficient landscaping will be installed.

[3] In accordance with HB 233—2008 Fire Protection Systems Testing—Water Conservation Handbook which provides building owners, consultants and system designers with recommendations for ways to reduce, re-use or recycle water used to test automatic fire sprinkler systems, hydrants, pumps and hose reels AND 200852 Fire Sprinkler Water Conservation Project Guide to Fire Sprinkler System Water Saving, Plumbing Industry Commission.

6. ENERGY

Production of Australia's energy is largely from the incineration of non-renewable fossil fuels and is the country's greatest contributor to greenhouse gas emissions. Australia's greenhouse gas emissions per person are amongst the highest in the world.

There is potential for substantial environmental savings through energy efficiency measures in Australian buildings. Greater efficiency of energy use, energy demand reduction methods and generation of energy from alternative sources are all means of addressing this urgent Issue.

The credits within the Energy Category target an overall reduction of energy consumption. Such reduction has an impact upon greenhouse gas emissions and energy production capacity as well as other emissions associated with energy generation. Reductions in energy demand and associated greenhouse gas emissions may be achieved through more efficient use of energy in buildings and generation of energy from alternative sources.

BESS has calculated that the design responses proposed for this development will achieve a 33% reduction in greenhouse gas emissions.

Energy		
Credit	**Aim**	**Design Response/ Project Compliance**
Heating and Cooling System		The rated capacity of the air conditioning equipment shall not exceed the design heating capacity by more than 20% and the design cooling capacity by more than 10%. The proposed HVAC EER/COP for the building = 4.0. See Appendix A – Preliminary Energy Efficiency Assessment for more details.
Domestic Hot Water		The building hot water system shall be a 90% efficient boiler with continuous flow centralised system powered by natural gas.
Car park Ventilation		A Carbon Monoxide monitoring system shall be installed to control the operation and speed of the VSD car park ventilation fans.
Internal Lighting		The maximum illumination power density (W/m2) in at least 90% of the student accommodations shall be at least 20% lower than required by Table J6.2a of the NCC 2016 BCA Volume 1 Section J (Class 2 to 9). LED lighting will be used throughout.

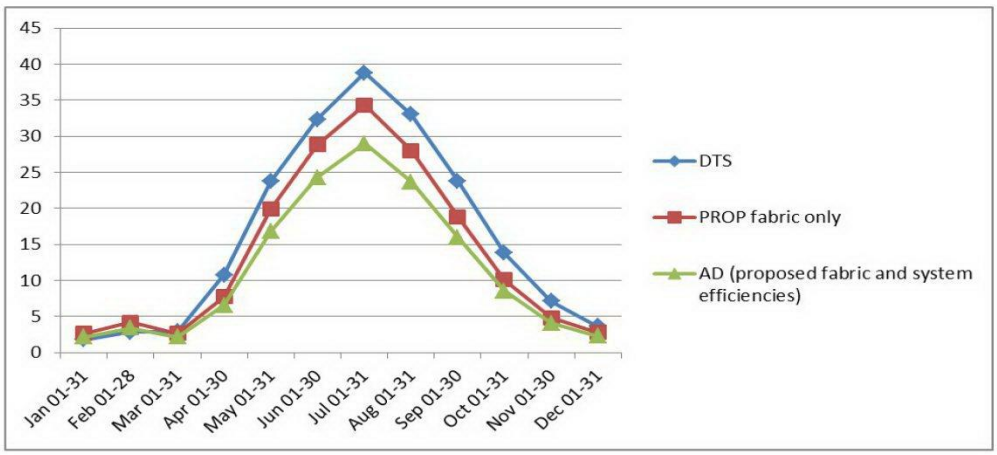


Figure 3 Summarised heating and cooling demands, monthly totals, demonstrating heating and winter dominant demands and impact of proposed efficiency enhancements (Building Fabric and HVAC). See Appendix A

7. STORMWATER

Continued urbanisation and expansion has resulted in a dramatic increase in areas of hard and impervious surfaces, such as buildings, roads and car parks. This has various negative impacts on waterways and their water quality, as well as on people, fauna and flora.

Best practice stormwater management means incorporating water sensitive urban design strategies such as rainwater tanks, raingardens, porous paving and landscaping to reduce the volume of run-off and the pollutant load on local waterways.

Stormwater		
Credit	**Aim**	**Design Response/ Project Compliance**
Stormwater Treatment	To minimise negative environmental impacts of stormwater runoff and maximise onsite re-use of stormwater	Rainwater will be collected from the roof for reuse in toilet flushing for the lodging rooms as well as the communal laundry. The remainder of stormwater arriving on site shall not be treated. Refer to Appendix B for the WSUD STORM assessment.

Melbourne Water

STORM Rating Report

TransactionID:	1152730	
Municipality:	MONASH	
Rainfall Station:	MONASH	
Address:	1959-63 Dandenong Rd	
	Clayton	
	VIC	3168
Assessor:	sbe	
Development Type:	Other	
Allotment Site (m2):	3,370.00	
STORM Rating %:	102	

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
clean roof	2,068.00	Rainwater Tank	40,000.00	100	134.40	72.00
remainder of site impermeable and untreated	663.00	None	0.00	0	0.00	0.00

Figure 4 Storm calculation. Site area = 3,370m2, roof area = 2,068m2, permable area = 639m2, remaining area = 663m2.

8. INDOOR ENVIRONMENT QUALITY

Indoor Environment Quality (IEQ) is a key ESD objective in the provision of a healthy and safe internal building environment for residents.

The IEQ category aims to balance other categories, in the sense that reductions in energy consumption could easily be achieved at the expense of occupants' comfort. Yet, occupant comfort is vital and as such the IEQ category encourages healthy and good indoor environmental quality.

Indoor Environment Quality		
Credit	**Aim**	**Design Response/ Project Compliance**
Daylight Access – Non Residential	What % of the nominated floor area has at least 2% daylight factor?	76.6% of the building nominated area (lodging rooms) achieves a Daylight Factor (DF) of 2% or more. See Appendix E. for modelling results.

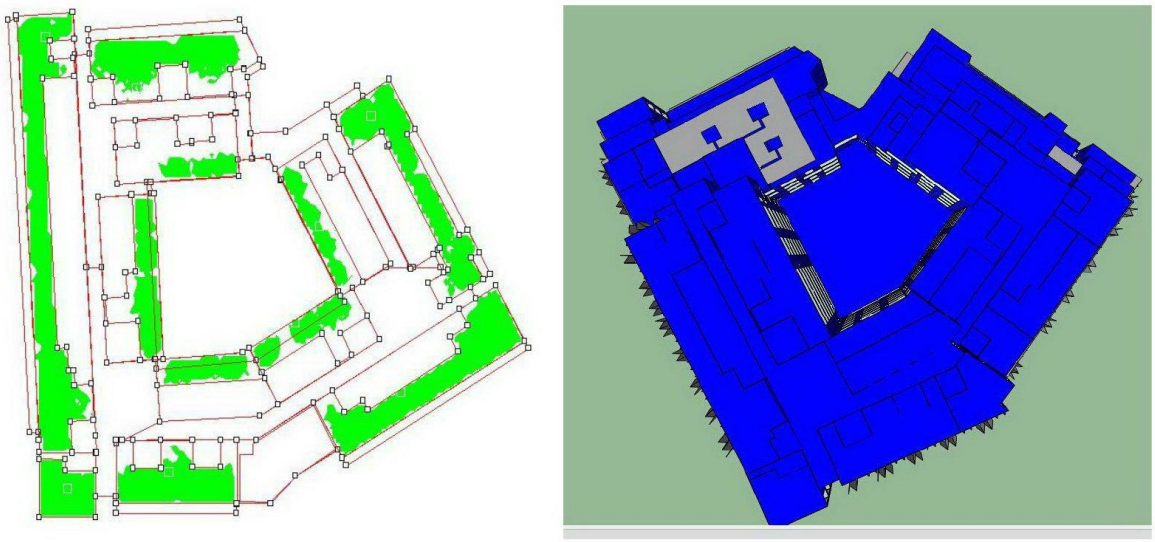


Figure 5 Daylight plots and modelling results in Appendix E

9. TRANSPORT

The automobile accounts for 54% of Australia's total domestic transport emissions and approximately 80% of adults use a private car to commute to and from work. Global warming is directly affected by motor vehicle use due to the high amounts of energy required to build cars and supporting infrastructure and services, as well as the greenhouse gas emissions within exhaust fumes. Car exhaust fumes also contribute to asthma and other respiratory illnesses.

There is a need to maximise alternative transport options if the environmental impact of car commuting is to be reduced. Options available may include trains, buses and, light rail trams. Walking and cycling are the most environmentally friendly alternatives, with no associated fuel use or pollutants.

All credits within the Transport category have the same underlying principle; to reward the reduction in automotive movement by simultaneously discouraging it and encouraging use of alternative transportation.

Transport		
Credit	**Aim**	**Design Response/ Project Compliance**
Bicycle Parking - Non-Residential	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)?	There are 237 lodging rooms. We have 135 bicycle spaces in total now – 129 for the student accommodation, 4 spaces for the staff of convenience shops/restaurants, and 2 spaces for visitors (convenience shops/ restaurant This exceeds Monash council's required 1 bike per 10 lodging rooms. (Ref Victoria Planning provisions Table 1 to Clause 52.34-5 Bicycle spaces.)
Bicycle Parking - Non-Residential Visitor	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)?	2 bike parks provided for visitors

The development is located within the City of Monash and scores 82% on the Walk Score.

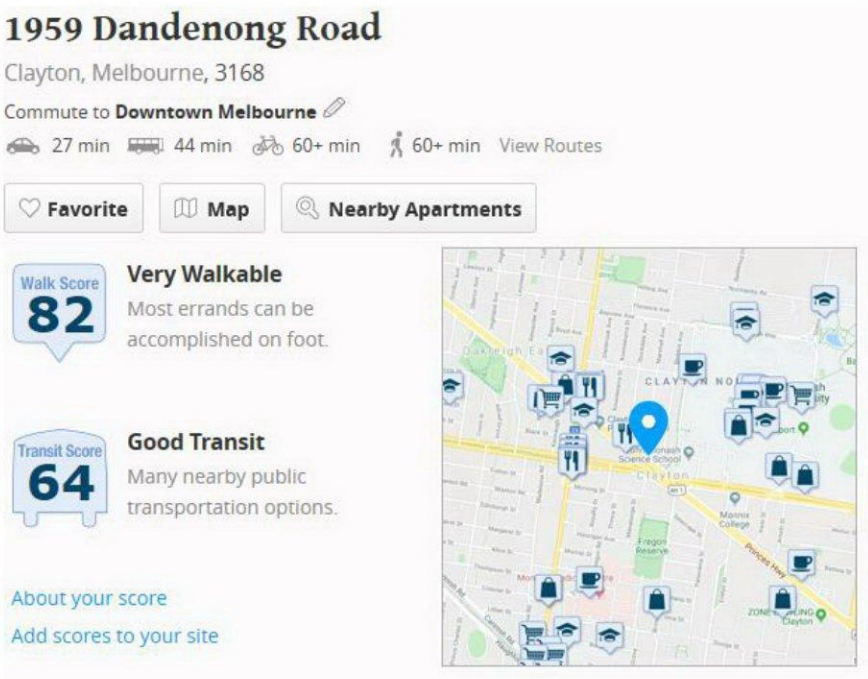


Figure 6 Walkscore from https://www.walkscore.com/score/

10. WASTE

Up to 40% of the waste going to Australia's landfills is related to the construction and demolition of buildings. Simple design decisions can influence the amount of construction waste being produced and operational waste streams being separated.

Even more waste is produced during the occupancy phase of buildings. Poor waste practices and treatment of the environment in the past have not only lead to a degradation of our water, air and land resources but also represent a big financial burden to current and future generations.

Waste		
Credit	**Aim**	**Design Response/ Project Compliance**
Operational Waste – Convenience of Recycling	To minimise recyclable material going to landfill	The building will have a combined waste storage area located in the basement connected to each floor via a waste chute.

Figure 7 Waste chutes at each level and waste handling rooms in basement.

11. URBAN ECOLOGY

The credits within the Land Use and Ecology category promote initiatives to improve or reduce impacts on ecological systems and biodiversity. The term 'Biodiversity' is used to describe the variation of life forms in a particular ecosystem and is often used as a measure of the health status of the environment.

Australia is home to more than one million different species, many of which are found nowhere else in the world. Australia is also a continent defined as 'megadiverse", which means that it has a very large variation of life forms in the environment.

Over the past few hundred years, development has caused displacement and degradation of much of Australia's natural flora and fauna and reduced biodiversity in many locations.

Achieving an increase in levels of biodiversity across an ecosystem may require protection and restoration of local indigenous flora and fauna.

The State of the Environment Report released in 2006 by the Department of Environment and Heritage indicates that regions with the most intense urban and agricultural development tend to have the highest levels of decline in number of species, habitats and ecological communities. More than 40% of nationally-listed threatened ecological communities, and more than 50% of threatened species, are in urban fringe areas.

Many credits in other categories have an indirect impact on the land use and ecology of the Australian environment, for example, the 'Stormwater' category addresses the rainwater run-off from buildings and hard surfaces in an attempt to prevent pollution from reaching nearby natural watercourses. This category, however, addresses the direct impact of a project on the ecological value of the site.

Urban Ecology		
Credit	**Aim**	**Design Response/ Project Compliance**
Communal Spaces	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251	303m2 required. Project provides games 190m2 + communal L2 38m2 + communal L3 38m2 + outdoor communal roof top and enclosed space 146m2 + north communal deck L4 35m2 + central courtyard 345m2 = 792m2
Vegetation	How much of the site is covered with vegetation, expressed as a percentage of the total site area	There is approximately 1028m2 of garden area (landscaping at grade). 1028 / 3370 = 30%

GARDEN AREA

GARDEN AREA = 1,028 SQM (30.5%)

SITE COVERAGE & PERMEABILITY AREA

TOTAL SITE AREA = 3,370 SQM
SITE COVERAGE AREA = 2,344 SQM (69.55%)
TOTAL PERMEABILITY AREA = 639 SQM (18.96%)

12. MATERIALS

The production and use of building materials can have serious impacts on the environment.

Energy is used to extract, produce and transport building materials; natural resources are exploited to be used in building materials; the industrial production of the materials causes pollution, and if poorly selected and used the material ends up as waste, to become landfill or incinerated.

The environmental impact from building materials is reduced by limiting the quantities of virgin building materials used in projects and choosing the least harmful when using virgin building materials.

Within the Materials category the credits target the consumption of resources through selection and re-use of materials, and efficient management practices. The basic concepts of the category are to reduce the amount of natural resources used, re-use whatever materials can be re-used, and recycle whenever possible.

Materials		
Credit	**Aim**	**Design Response/ Project Compliance**
Timber Products	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	At least 95% (by cost) of all timber used in the building and construction works shall either be: • Certified by a forest certification scheme and be accompanied by a relevant Chain of Custody (CoC) certificate; or • Be from a reused source.
Permanent Formwork, Pipes, Flooring, Blinds and Cables		At least 90% (by cost) of all permanent formwork, pipes, flooring, blinds and cables in a project shall either: • Not contain PVC and have an Environmental Product Declaration (EPD); or • Meet Best Practice Guidelines for PVC.
Product Transparency and Sustainability	To encourage sustainability and transparency in product specification.	Products and manufacturers complying with the following standards and certifications shall be chosen in preference to non-compliance choices, where they are equally suitable for use and selection does not impact the project budget: • Products with a product-specific, third-party verified EPD; • Products with a industry-wide, third-party verified EPD; • Carpet Institute of Australia Environmental Certification Scheme (ECS); • Ecospecifier Green Tag GreenRate; • Australasian Furnishing Research and Development Institute Green Tick; • Good Environmental Choice Australia; • The institute for Market Transformation to Sustainability Sustainable Materials Rating Technology; • Manufacturer Environmental Management System (ISO14001); • Manufacturer certified to SA8000 social accountability standard or GeSI management standards; and • Products certified to Fairtrade Mark.
Recycled Construction Materials	To encourage sustainability and re-use of materials in the product specification.	Where equally suitable for use and selection does not impact the project budget, construction materials with a recycled content shall be chosen in preference to materials without a recycled content.
Construction and Demolition Waste	To limit waste going to landfill.	At least 60% of the waste generated during construction and demolition shall be diverted from landfill. This commitment shall be included in the contractual documentation.

13. INNOVATION

The ‘Innovation' criteria aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.

The 'Innovation' criterion also rewards projects that can demonstrate that sustainability principles have been incorporated not at a project level, but also in a broader sense. This may include, for instance, collaboration between building owners and tenants, disclosure of the financial impacts of sustainability or delivering sustainable education content to site workers.

No credits claimed for this category.

14. CONCLUSION

This report outlines the range of ESD initiatives that have been included in the design of the proposed student accommodation at 1959-1963 Dandenong Road & 75 Beddoe Ave, Clayton.

The development proposal demonstrates a holistic approach to sustainable urban development that addresses the ESD objectives of the City of Monash (Clause 22.13 of the City of Monash Planning Scheme).

A copy of the BESS scorecard used to complete this assessment in accordance to the City of Monash Planning Scheme is attached in Appendix F.

APPENDIX A – PRELIMINARY ENERGY EFFICIENCY ASSESSMENT

Deemed to Satisfy (DTS) = Roof R3.2, External Walls R2.8, Internal walls R1.8, Exposed slab R2.0, Glazing (See sample glazing calculator below, HVAC COP/EER 3.2, gas fire DHW boiler (with 75% efficiency).

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014) — HELP

Building name/description: Monash Student housing | Application: Class 3 | Climate zone: 6

Storey: GF

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	192m²		235m²			209m²	198m²		
Option B									n/a
Glazing area (A)	*58.8m²*		*154m²*			*123m²*	*86.4m²*		

Number of rows preferred in table below: 16 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	SW façade ext	SW		2.70	36.80		2.5	0.70	1.000	3.000	0.33	0.30	0.93	0.89	99.36	80% of 100%
2	East façade ext	E		2.70	48.30		2.0	0.10	1.000	3.000	0.33	0.30	0.93	0.89	######	83% of 96%
3	west façade ext	W		2.70	10.88		2.0	0.23	1.000	3.000	0.33	0.30	0.93	0.88	29.38	32% of 100%
4	north façade ext	N		2.70	9.57		6.0	0.33	1.000	3.000	0.33	0.30	0.97	0.84	25.84	37% of 99%
5	SW façade Int	SW		2.70		24.00	2.5	0.70				0.00	1.00	1.00	24.00	20% of 100%
6	East façade Int	E		2.70		24.00	2.0	0.10				0.00	1.00	1.00	24.00	17% of 96%
7	west façade Int	W		2.70		57.00	2.0	0.23				0.00	1.00	1.00	57.00	68% of 100%
8	north façade Int	N		2.70		33.00	6.0	0.33				0.00	1.00	1.00	33.00	63% of 99%
9																

As Designed (AD) = Roof: R5.0, External Walls R2.8, Internal Walls R1.8, Exposed slab R2.0, Glazing U2.5 -SHGC 0.6 throughout. HVAC EER/COP 4.0, gas fire DHW boiler (with 90% efficiency).

	ext wall R2.8							
	roof R3.2							
	glazing DTS							
	COP and EER 3.1							
	lighting 9W/m2							
	dhw efficiency 0.75				DHW			
	Ap Sys boilers space cond'g	Ap Sys chillers energy (MWh)				Ap Sys boilers DHW energy (M\		
DTS								
Date	210510 DTS 1.aps	210510 DTS 1.aps			Date	210510 DTS 1.aps		
Jan 01-31	0.8037	0.8424			Jan 01-31	4.3771		
Feb 01-28	0.5645	2.0842			Feb 01-28	3.9441		
Mar 01-31	2.1827	0.5422			Mar 01-31	4.3589		
Apr 01-30	9.762	0.0169			Apr 01-30	4.2206		
May 01-31	21.2182	0.0001			May 01-31	4.3771		
Jun 01-30	28.7479	0			Jun 01-30	4.2206		
Jul 01-31	34.3837	0			Jul 01-31	4.368		
Aug 01-31	29.2423	0			Aug 01-31	4.368		
Sep 01-30	20.9702	0.0008			Sep 01-30	4.2206		
Oct 01-31	12.1563	0.1206			Oct 01-31	4.3771		
Nov 01-30	6.185	0.26			Nov 01-30	4.2206		
Dec 01-31	2.8711	0.5191			Dec 01-31	4.3589		
Summed t	169.0877	4.3863	173.474		Summed t	51.4118	MWh	
			173474			185082.5	MJ	
AD	U2.5 G0.6				DHW			
	Ap Sys boilers space cond'g	Ap Sys chillers energy (MWh)				Ap Sys boilers DHW energy (M\		
Date	210510 AD 1.aps	210510 AD 1.aps			Date	210510 AD 1.aps		
Jan 01-31	0.0776	2.1957			Jan 01-31	2.918		
Feb 01-28	0.0871	3.4549			Feb 01-28	2.6294		
Mar 01-31	0.5792	1.5428			Mar 01-31	2.9059		
Apr 01-30	5.0202	0.1443			Apr 01-30	2.8137		
May 01-31	13.7604	0.0066			May 01-31	2.918		
Jun 01-30	20.4061	0			Jun 01-30	2.8137		
Jul 01-31	24.0911	0.0002			Jul 01-31	2.912		
Aug 01-31	19.2232	0.0071			Aug 01-31	2.912		
Sep 01-30	12.3832	0.0508			Sep 01-30	2.8137		
Oct 01-31	5.9259	0.4613			Oct 01-31	2.918		
Nov 01-30	2.1742	0.9179			Nov 01-30	2.8137		
Dec 01-31	0.6351	1.3537			Dec 01-31	2.9059		
Summed t	104.3632	10.1355	114.4987	33%	Summed t	34.2743	MWh	
			114498.7			123387.5	MJ	
	increase in COP and EER from 3.1 to 4.0							
	increase in dhw efficny from 0.75 to 0.95							
	lighting 7W/m2							
	ext walls R3.11							
	glazing proposed JV3							
	roof R3.7							

Figure 8 Modelling outputs for Base Case (DTS) and As Designed (AD).

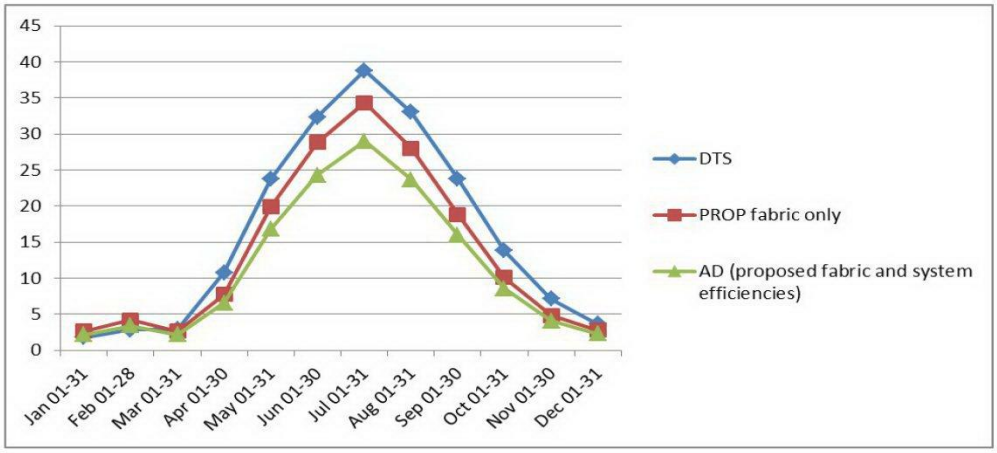


Figure 9 Summarised heating and cooling demands, monthly totals, demonstrating heating and winter dominant demands and impact of proposed efficiency enhancements (Building Fabric and HVAC).

Clause	Design Response/ Project Compliance
J3.4 Windows and Doors	A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like when forming part of the envelope of a conditioned space or the external fabric of a habitable room of public area.
J3.5 Exhaust Fans	Miscellaneous exhaust fans must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space or a habitable room.
J3.6 Construction of Roofs, Walls and Floors	Roofs, ceiling, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be enclosed by internal lining systems that are close fitting at ceiling, wall, and floor junctions, or sealed by caulking, skirting, architraves, cornices or the like when forming part of the envelope or the external fabric of a habitable room or public area.

Table 3: Preliminary Section J Part J1-J3 assessment

APPENDIX B – STORMWATER TREATMENT

Rainwater will be collected from the roof for reuse for toilet flushing in the lodging rooms as well as the communal laundry.
The remainder of stormwater arriving on site shall not be treated prior to discharge.

639m2 is calculated as permeable area (ie not covered in building or located over basement.

SITE COVERAGE & PERMEABILITY AREA

TOTAL SITE AREA = 3,370 SQM
SITE COVERAGE AREA = 2,344 SQM (69.55%)
TOTAL PERMEABILITY AREA = 639 SQM (18.96%)

Figure 10 Permeable area (khaki green) = 639m2

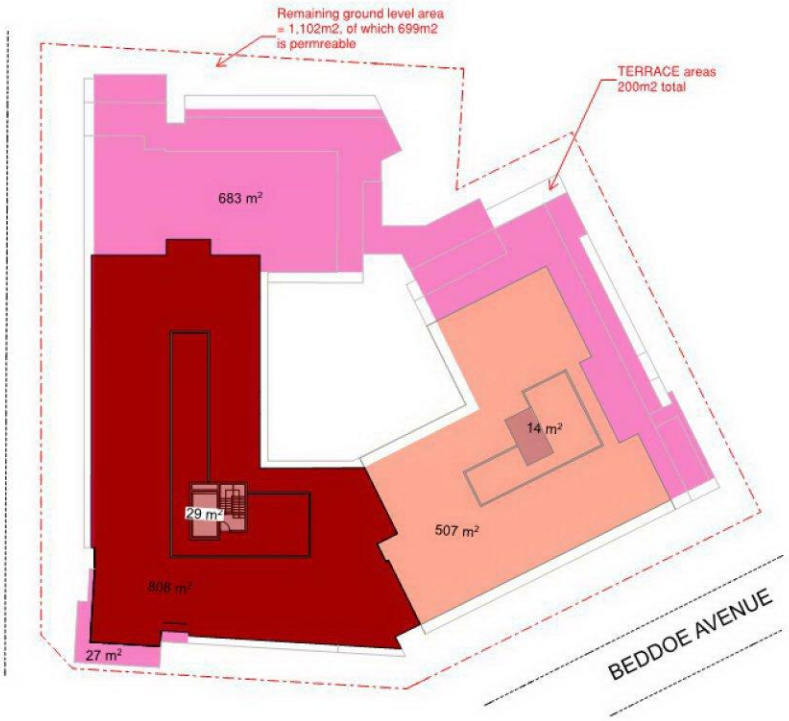


Figure 11 Total clean roof area (for rainwater collection) = 683+29+808+27+507+14 = 2,068m2.

Melbourne Water

STORM Rating Report

TransactionID:	1152730
Municipality:	MONASH
Rainfall Station:	MONASH
Address:	1959-63 Dandenong Rd
	Clayton
	VIC 3168
Assessor:	sbe
Development Type:	Other
Allotment Site (m2):	3,370.00
STORM Rating %:	102

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
clean roof	2,068.00	Rainwater Tank	40,000.00	100	134.40	72.00
remainder of site impermeable and untreated	663.00	None	0.00	0	0.00	0.00

Figure 12 Storm Calculation. Site area = 3,370m2, roof area = 2,068m2, permable area = 639m2, remaining area = 663m2.

APPENDIX C – PAINTS, ADHESIVE, SEALANTS AND CARPETS

The following TVOC limits are applicable to all internal applications of all types of paints, adhesives or sealants applied on-site, including both exposed and concealed applications. If exterior grade products are used in an internal application then these must also meet the requirements.

The following items are excluded from this credit:

- Glazing film, tapes, and plumbing pipe cements;
- Products used in car park;
- Paints, adhesives and sealants used off-site, for example applied to furniture items in a manufacturing site and later installed in the fitout; and
- Adhesives and mastics used for temporary formwork and other temporary installations.

Product Type	Maximum TVOC Content (g/litre of ready to use product)
General purpose adhesive and sealants	50
Interior wall and ceiling paints, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealants, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Table 4: Maximum TVOC Limits for Paints, Adhesives and Sealants

Further, carpets used in the project must either be:

- Certified under a recognised Product Certification Scheme (listed on the GBCA website) or other recognised standards; or
- Compliant with the Total VOC (TVOC) limits specified in the table below.

Product Type	Maximum TVOC Content (g/litre of ready to use product)
ASTM D5116 – Total VOC limit	0.5mg/m2 per hour
ASTM D5116 – 4-PC (4 – Phenylcyclohexene)	0.05mg/m2 per hour
ISO 16000 / EN 13419 – TVOC at three days	0.5mg/m2 per hour
ISO 10580 / ISO/TC 219 (Document N238) – TVOC at 24 hours	0.5mg/m2 per hour

Table 5: Carpet Test Standards and TVOC Emissions Limits

APPENDIX D – ENGINEERED WOOD PRODUCTS

The term "engineered wood products" includes composite wood products and includes raw/ unfinished as well as finished products. Items not covered by these limits include products used in exterior applications, formwork, internal car park applications, re-used products, and raw timber. All emission levels must be established by a NATA or ISO/IEC 17025 registered laboratory as per the testing methodologies in the table above.

Test Protocol	Emission Limit / Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1.0 mg/L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.0 mg/L
AS/NZS 4357.4 – Laminated Veneer Lumber (LVL)	≤1.0 mg/L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1.0 mg/L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1.0 mg/L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1.0 mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/ m²hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³**
ASTM E1333	≤0.12mg/m³***
EN 717-1 (also known as DIN EN 717-1)	≤0.12 mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5 mg/m²hr
**The test report must confirm that the conditions of this table comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.	
*** The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.	

Table 6: Formaldehyde emission limit values for engineered wood products

APPENDIX E – DAYLIGHT ASSESSMENT

Below are the assumptions that have been included in the daylight assessment for the building component (student accommodations, café and ground floor facilities) and the results obtained.

General Building Simulation Parameters	
Address	1959-1963 Dandenong Road & 75 Beddoe Ave, Clayton
Terrain Type	suburban
Climate Zone	6
Building Class	3 (student accommodation)
Sky	10,000 Lux CIE overcast sky
Working Plane	Floor level
Software	IES VE 2019
Application	FlucsDL
Assessed Areas	• Student accommodation (lodging rooms) • associated administration, communal and shop/retail area located on the ground floor
Total Assessed Floor Area[4]	5,528m2

Building Element Parameters	
Element	**Reflectance**
Floor	0.30
Wall	0.70
Ceiling	0.75
Roof	0.30
Ground	0.30
Glazing (VLT)	0.70
Translucent glass balustrades and privacy dividers	0.80

Shading Elements	
Element	**Description**
Local shading	All geometries have been modelled as per the architectural drawings including fixed perforated metal panels.

Table 7: Daylight simulation parameters

Threshold Calculation

Building Results

Total floor area (m^2)	Total floor area above threshold (m^2)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
5528.653	4233.788	76.6	6.7	674.918

Figure 13 Results extract. 76.6% of the nominated floor area achieved a DF>2%. SEE full results in Flucs DL DF Report at the end of this Appendix.

[4] Total Assessed Floor Area (a.k.a nominated area) excludes circulation, utility, small kitchenettes and back of house spaces.

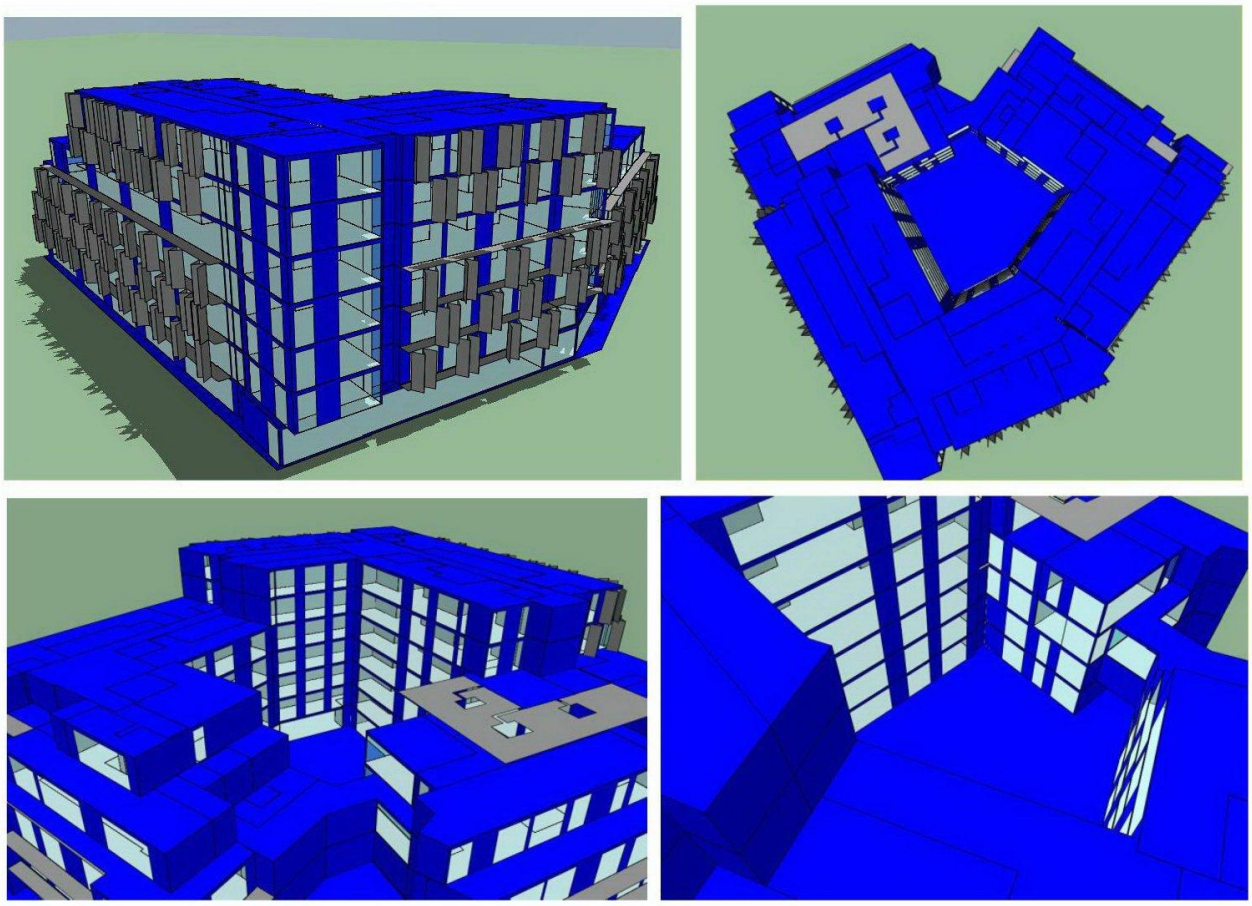


Figure 14 Daylighting and energy model images.

Figure 15 Daylight Plot, Ground floor. Areas in green have a DF>2%.

Figure 16 Daylight Plot, First floor. Areas in green have a DF>2%.

Figure 17 Daylight Plot, Second floor. Areas in green have a DF>2%.

Figure 18 Daylight Plot, Third floor. Areas in green have a DF>2%.

Figure 19 Daylight Plot, Fourth floor. Areas in green have a DF>2%.

Figure 20 Daylight Plot, Fifth floor. Areas in green have a DF>2%.

Figure 21 Daylight Plot, Sixth floor. Areas in green have a DF>2%.

APPENDIX F – BESS SCORECARD

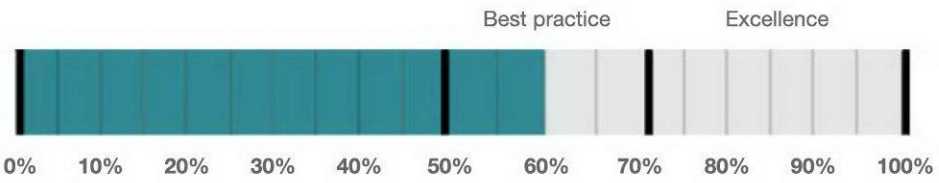
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 1959 Dandenong Rd Clayton VIC 3168. 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 Moreland 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

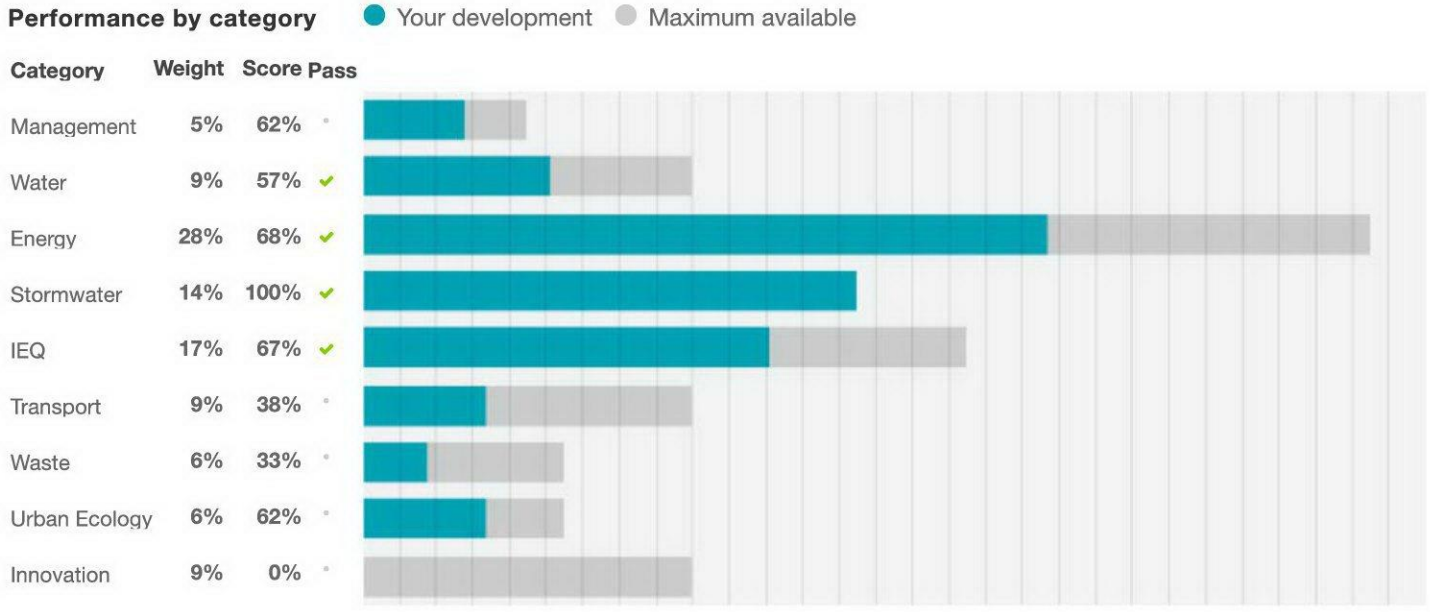


60%

Project details

Address	1959 Dandenong Rd Clayton VIC 3168
Project no	5D746121-R5
BESS Version	BESS-4
Site type	Non-residential development
Account	lakshmee.rajpati@sbe.com.au
Application no.	
Site area	3,370 m²
Building floor area	13,258.0 m²
Date	26 May 2021
Software version	1.7.0-B.360

Performance by category



Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	% of total area
Other building			
Student housing	1	13,258 m²	100%
Total	**1**	**13,258 m²**	**100%**

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.2	Individual utility meters annotated		-
Management 3.3	Common area submeters annotated		-
Water 3.1	Water efficient garden annotated		-
Energy 3.1	Carpark with natural ventilation or CO monitoring system		-
Stormwater 1.1	Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)		-
Transport 1.4	All nominated non-residential bicycle parking spaces		-
Transport 1.5	All nominated non-residential visitor bicycle parking spaces		-
Waste 2.2	Location of recycling facilities		-
Urban Ecology 1.1	Size and location of communal spaces		-
Urban Ecology 2.1	Vegetated areas		-

Supporting evidence

Credit	Requirement	Response	Status
Management 2.3	Preliminary modelling report		-
Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Energy 3.1	Provide a written explanation of either the fully natural carpark ventilation or carbon monxide monitoring, describing how these systems will work, what systems are required for them to be fully integrated and who will be responsible for their implementation throughout the design, procurement and operational phases of the building life.		-
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		-
IEQ 1.4	A short report detailing assumptions used and results achieved.		-

Credit summary

Management Overall contribution 4.5%

62%

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

Water Overall contribution 9.0%

Minimum required 50% | 57% | ✔ Pass

1.1 Potable water use reduction	40%
3.1 Water Efficient Landscaping	100%
4.1 Building Systems Water Use Reduction	100%

Energy Overall contribution 27.5%

Minimum required 50% | 68% | ✔ Pass

1.1 Thermal Performance Rating - Non-Residential	50%
2.1 Greenhouse Gas Emissions	100%
2.2 Peak Demand	0%
2.3 Electricity Consumption	100%
2.4 Gas Consumption	100%
3.1 Carpark Ventilation	100%
3.2 Hot Water	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%	67%	✔ Pass
1.4 Daylight Access - Non-Residential	67%	

Transport Overall contribution 9.0%

	38%
1.4 Bicycle Parking - Non-Residential	100%
1.5 Bicycle Parking - Non-Residential Visitor	100%
1.6 End of Trip Facilities - Non-Residential	0%
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%

	62%
1.1 Communal Spaces	100%
2.1 Vegetation	100%
2.2 Green Roofs	0%
2.3 Green Walls and Facades	0%
3.2 Food Production - Non-Residential	0%

Innovation Overall contribution 9.0%

	0%
1.1 Innovation	N/A ⊘ Disabled
	None

Credit breakdown

Management Overall contribution 3%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 37.5% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.3 Thermal Performance Modelling - Non-Residential		100%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Has preliminary modelling been undertaken in accordance with either BCA Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Other building	Yes	
3.2 Metering		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have utility meters been provided for all individual commercial tenants?	
Question	Criteria Achieved ?	
Other building	Yes	
3.3 Metering		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Other building	Yes	
4.1 Building Users Guide		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	Yes	

Water Overall contribution 5% Minimum required 50%

Water Approach		
What approach do you want to use 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		
Showerhead		3 Star WELS (>= 6.0 but <= 7.5)
Bath		Scope out
Kitchen Taps		>= 5 Star WELS rating
Bathroom Taps		>= 6 Star WELS rating
Dishwashers		Scope out
WC		>= 4 Star WELS rating
Urinals		Scope out
Washing Machine Water Efficiency		>= 5 Star WELS rating
Which non-potable water source is the dwelling/space connected to?		Tank 1
Non-potable water source connected to Toilets		Yes
Non-potable water source connected to Laundry (washing machine)		Yes
Non-potable water source connected to Hot Water System		No
Rainwater Tank		
What is the total roof area connected to the rainwater tank?	Tank 1	2,068 m²
Tank Size	Tank 1	40,000 Litres
Irrigation area connected to tank	Tank 1	0.0 m²
Other external water demand connected to tank?	Tank 1	0.0 Litres/Day

1.1 Potable water use reduction	40%
Score Contribution	This credit contributes 71.4% towards the category score.
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.
Output	Reference (kL)
Project	31551
Output	Proposed (excluding rainwater and recycled water use) (kL)
Project	22084
Output	Rainwater or recycled water supplied (Internal + External) (kL)
Project	1023
Output	Proposed (including rainwater and recycled water use) (kL)
Project	21061
Output	% Reduction in Potable Water Consumption
Project	33 %

3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	

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

Energy Overall contribution 19% Minimum required 50%

Are you installing a cogeneration or trigeneration system?	No
Non-Residential Spaces Energy Profile	
Heating, Cooling & Comfort Ventilation - Electricity - baseline	173,474 kWh
Heating, Cooling & Comfort Ventilation - Electricity - proposed	114,499 kWh
Heating - Gas - baseline	0.0 MJ
Heating - Gas - proposed	0.0 MJ
Heating - Wood - baseline	0.0 MJ
Heating - Wood - proposed	0.0 MJ
Hot Water - Electricity - baseline	0.0 kWh
Hot Water - Electricity - proposed	0.0 kWh
Hot Water - Gas - baseline	185,082 MJ
Hot Water - Gas - proposed	123,387 MJ
Peak Thermal Cooling Load - Baseline	-
Peak Thermal Cooling Load - Proposed	-

1.1 Thermal Performance Rating - Non-Residential		50%
Score Contribution	This credit contributes 36.4% towards the category score.	
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2016 BCA Volume 1 Section J)?	
Output	Total Improvement	
Other building	33 %	
2.1 Greenhouse Gas Emissions		100%
Score Contribution	This credit contributes 9.1% towards the category score.	
Criteria	Are greenhouse gas emissions >10% below the benchmark?	
Output	Reference Building with Reference Services (BCA only)	
Other building	195,130 kg CO2	
Output	Proposed Building with Proposed Services (Actual Building)	
Other building	128,856 kg CO2	
Output	% Reduction in GHG Emissions	
Other building	33 %	
2.2 Peak Demand		0%
Score Contribution	This credit contributes 4.5% towards the category score.	
Criteria	Has the instantaneous (peak-hour) demand been reduced by >25%?	

2.3 Electricity Consumption	100%
Score Contribution	This credit contributes 9.1% towards the category score.
Criteria	Is the annual electricity consumption >10% below the benchmark?
Output	Reference
Other building	173,474 kWh
Output	Proposed
Other building	114,499 kWh
Output	Improvement
Other building	33 %
2.4 Gas Consumption	100%
Score Contribution	This credit contributes 9.1% towards the category score.
Criteria	Is the annual gas consumption >10% below the benchmark?
Output	Reference
Other building	185,082 MJ
Output	Proposed
Other building	123,387 MJ
Output	Improvement
Other building	33 %
3.1 Carpark Ventilation	100%
Score Contribution	This credit contributes 9.1% towards the category score.
Criteria	If you have a basement carpark, is it either: (a) fully naturally ventilated (no mechanical ventilation system), or (b) use Carbon Monoxide monitoring to control the operation and speed of the ventilation fans?
Question	Criteria Achieved ?
Project	Yes
3.2 Hot Water	100%
Score Contribution	This credit contributes 4.5% towards the category score.
Criteria	Does the hot water system use >10% less energy (gas and electricity) than the reference case?
Output	Reference
Other building	51,412 kWh
Output	Proposed
Other building	34,274 kWh
Output	Improvement
Other building	33 %

3.7 Internal Lighting - Non-Residential		100%	
Score Contribution	This credit contributes 9.1% 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 2016 BCA Volume 1 Section J (Class 2 to 9)?		
Question	Criteria Achieved ?		
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	100	
Output	Min STORM Score	
Project	100	

IEQ

Overall contribution 11% Minimum required 50%

1.4 Daylight Access - Non-Residential		67%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	What % of the nominated floor area has at least 2% daylight factor?	
Question	Percentage Achieved?	
Other building	76 %	

Transport Overall contribution 3%

1.4 Bicycle Parking - Non-Residential	100%
Score Contribution	This credit contributes 25.0% 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)?
Annotation	There are 237 lodging rooms. We have 135 bicycle spaces in total now – 129 for the student accommodation, 4 spaces for the staff of convenience shops/restaurants, and 2 spaces for visitors (convenience shops/ restaurant This exceeds Monash council's required 1 bike per 10 lodging rooms. (Ref Victoria Planning provisions Table 1 to Clause 52.34-5 Bicycle spaces.)
Question	Criteria Achieved ?
Other building	Yes
Question	Bicycle Spaces Provided ?
Other building	133

1.5 Bicycle Parking - Non-Residential Visitor	100%
Score Contribution	This credit contributes 12.5% 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 ?
Other building	Yes
Question	Bicycle Spaces Provided ?
Other building	2

1.6 End of Trip Facilities - Non-Residential	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Where adequate bicycle parking has been provided. Is there also: * 1 shower for the first 5 employee bicycle spaces plus 1 to each 10 employee bicycles spaces thereafter, * changing facilities adjacent to showers, and * one secure locker per employee bicycle space in the vicinity of the changing / shower facilities?
Question	Number of showers provided ?
Other building	0
Question	Number of lockers provided ?
Other building	0
Output	Min Showers Required
Other building	1
Output	Min Lockers Required
Other building	133

2.1 Electric Vehicle Infrastructure	0%
Score Contribution	This credit contributes 25.0% 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 12.5% 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 12.5% 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		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?	
Annotation	games 190m2 + communal L2 38m2 + communal L3 38m2 + outdoor communal roof top and enclosed space 146m2 + north communal deck L4 35m2 + central courtyard 345m2 = 792	
Question	Common space provided	
Other building	792 m²	
Output	Minimum Common Space Required	
Other building	303 m²	
2.1 Vegetation		100%
Score Contribution	This credit contributes 50.0% towards the category score.	
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?	
Annotation	699m2 of permeable site area (landscaping at grade). 1028/ 3370 = 30%	
Question	Percentage Achieved ?	
Project	30 %	
2.2 Green Roofs		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	
2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green wall or facade?	
Question	Criteria Achieved ?	
Project	No	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there at least 0.25m² of space per occupant dedicated to food production?	
Question	Food Production Area	
Other building	0.0 m²	
Output	Min Food Production Area	
Other building	166 m²	

Innovation Overall contribution 0%

1.1 Innovation		N/A	⊘ Disabled
This credit is disabled	None		

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.

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Daylight Analysis

IES
Integrated
Environmental
Solutions Limited

Analysis Overview

Analysis Comparison (against previous assessment)

	Total	Comparison (with previous)
Daylight levels (lux)	674.918	**Same**
Percentage area above threshold (%)	76.6	**Same**

Analysis History

Date / Time	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
05 May 2021 at 7:43 PM	6.7	675.388
05 May 2021 at 7:57 PM	6.7	674.918

Threshold Calculation

Building Results

Total floor area (m^2)	Total floor area above threshold (m^2)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
5528.653	4233.788	76.6	6.7	674.918

Rooms included in the analysis

Room ID	Room name	Working plane	Floor area (m^2)	Floor area > threshold (m^2)	Percentage floor area > threshold (%)	Average illumination (%)
G0000000	G A01-A10	0	175.814	152.439	**86.7**	7.30
G1000000	G A11-A14	0	109.470	66.967	**61.2**	4.19
G1000003	G A15-A17	0	81.929	14.782	**18.0**	1.04
G1000004	G A18-A21	0	65.232	38.501	**59.0**	3.53
GB000001	G B01-B04	0	76.761	47.662	**62.1**	4.43
GB000003	G B08-B11	0	59.702	18.657	**31.3**	1.86
GB000004	G B05-B07 and admin	0	106.300	66.126	**62.2**	5.05
GG000000	G Games	0	192.770	62.843	**32.6**	2.20
GS000000	G shop and admin	0	140.421	135.211	**96.3**	8.79
GF000000	G foyer	0	83.340	77.084	**92.5**	9.40
L1000000	L1 A19-A22	0	109.470	70.179	**64.1**	4.19
L1000003	L1 A23-A25	0	81.929	18.791	**22.9**	1.38
L1000004	L1 A26-A29	0	65.232	44.142	**67.7**	4.51

Things to consider:

Increase amount of **glazing** (assess **trade-off** with energy consumption)

Evaluate size and shape of glass (glass **above** 2.3m (7'6") has **greater impact**)

Select a **glass type** with a different **visible transmittance** (Tvis)

Evaluate other daylighting metrics such as **glare**

L1000007	L1 B14-B17	0	59.702	26.617	**44.6**	2.65
L1000009	L1 A09-A18	0	184.303	165.624	**89.9**	7.49
L100000B	L1 B06-B10	0	117.192	107.447	**91.7**	8.81
L100000D	L1 A01-A03	0	36.655	24.437	**66.7**	3.88
L100000F	L1 B11-B13	0	53.746	27.244	**50.7**	3.19
L1000012	L1 A04-A07	0	81.547	60.592	**74.3**	5.37
L1000015	L1 A08	0	38.977	38.483	**98.7**	11.04
L1000017	L1 B01-B05	0	106.670	89.932	**84.3**	5.42
L2000000	L2 A20-A23	0	109.470	79.322	**72.5**	6.21
L2000004	L2 A27-A30	0	65.232	49.292	**75.6**	5.52
L2000007	L2 B15-B18	0	59.702	32.836	**55.0**	3.54
L2000009	L2 A10-A19	0	184.303	166.371	**90.3**	7.87
L200000B	L2 B06-B10	0	117.192	108.447	**92.5**	9.04
L200000D	L2 A01-A03	0	36.655	25.659	**70.0**	4.71
L200000F	L2 B12-B14	0	53.746	31.455	**58.5**	3.92
L2000012	L2 A05-A08	0	81.547	61.602	**75.5**	5.49
L2000015	L2 A09	0	38.977	38.483	**98.7**	11.39
L2000016	L2 B01-B05 *	0	106.670	96.677	**90.6**	7.16
L2000019	L2 A04	0	38.315	30.851	**80.5**	7.16
L200001A	L2 B11	0	32.451	20.968	**64.6**	4.80
L3000000	L3 A25-A28	0	65.232	55.177	**84.6**	6.75
L3000002	L3 A01-A03	0	36.655	28.591	**78.0**	5.37
L3000004	L3 B10-B12	0	53.746	35.665	**66.4**	4.75
L3000007	L3 A05-A08	0	81.547	62.612	**76.8**	5.53
L300000A	L3 A09	0	38.977	38.483	**98.7**	11.31
L300000C	L3 A04	0	38.315	30.851	**80.5**	7.31
L300000D	L3 B09	0	32.451	21.967	**67.7**	4.93
L300000F	L3 B01-B03 *	0	80.174	75.163	**93.8**	9.09
L3000011	L3 B04-B08 *	0	97.036	84.281	**86.9**	8.71
L3000014	L3 B13-B15	0	52.777	34.604	**65.6**	5.12
L3000015	L3 A10-A18	0	161.227	150.160	**93.1**	9.60
L3000017	L3 A19-A21	0	94.447	89.268	**94.5**	7.68
L4000000	L4 A18-A21	0	65.232	55.913	**85.7**	7.67
L4000002	L4 A01-A03	0	36.655	29.569	**80.7**	6.09
L4000004	L4 B07-B09	0	53.746	40.619	**75.6**	5.83
L4000007	L4 A05-A08	0	81.547	65.137	**79.9**	7.31

L400000A	L4 A09	0	38.977	38.730	**99.4**	11.53
L400000C	L4 A04	0	38.315	32.593	**85.1**	8.90
L400000D	L4 B06	0	32.451	23.714	**73.1**	6.19
L4000011	L4 A10-A17	0	163.003	152.519	**93.6**	10.48
L4000012	L4 Communal	0	38.239	31.402	**82.1**	4.70
L4000014	L4 B03-B05	0	55.855	50.120	**89.7**	10.69
L4000016	L4 B01, 10-11 *	0	80.824	58.622	**72.5**	6.86
L4000019	L4 B02	0	42.751	37.751	**88.3**	8.15
L5000000	L5 A01-A03	0	36.655	32.257	**88.0**	7.36
L5000003	L5 A05-A08	0	81.547	63.875	**78.3**	7.04
L5000006	L5 A09	0	38.977	38.483	**98.7**	11.18
L5000008	L5 A16-A19	0	91.610	78.347	**85.5**	7.78
L500000B	L5 A10-A15	0	132.866	118.985	**89.6**	9.48
L500000C	L5 A04	0	38.449	35.952	**93.5**	9.79
L6000000	L6 A01-A03	0	36.655	33.234	**90.7**	8.23
L6000003	L6 A05-A08	0	81.547	64.632	**79.3**	7.12
L6000006	L6 A09	0	38.977	37.990	**97.5**	11.22
L6000008	L6 A16-A19	0	91.610	78.102	**85.3**	8.27
L600000B	L6 A10-A15	0	132.866	120.472	**90.7**	9.49
L600000C	L6 A04	0	38.449	36.451	**94.8**	9.85
L200001C	L2 A24-A25	0	51.090	13.145	**25.7**	1.60
L300001B	L3 A22-A24	0	50.480	16.173	**32.0**	2.00
L2000002	L2 communal	0	38.401	15.561	**40.5**	3.92
L3000018	L3 communal	0	36.874	30.894	**83.8**	8.98

Rooms not included in the analysis

Room ID	Room name	Reason
G0000001	G A01-A10 BOH	Not selected for inclusion in report
G1000001	G A11-A14 BOH	Not selected for inclusion in report
G1000002	G A15-A17 BOH	Not selected for inclusion in report
G1000005	G A18-A21 BOH	Not selected for inclusion in report
GB000000	G B01-B04 BOH	Not selected for inclusion in report
GB000002	G B08-B11 BOH	Not selected for inclusion in report
GB000005	G B05-B07 BOH	Not selected for inclusion in report
GC000000	G circulation	Not selected for inclusion in report
BS000000	basement	Not selected for inclusion in report

L1000001	L1 A19-A22 BOH	Not selected for inclusion in report
L1000002	L1 A23-A25 BOH	Not selected for inclusion in report
L1000005	L1 A26-A28 BOH	Not selected for inclusion in report
L1000006	L1 B14-B17 BOH	Not selected for inclusion in report
L1000008	L1 A09-A18 BOH	Not selected for inclusion in report
L100000A	L1 B01-B05 BOH	Not selected for inclusion in report
L100000C	L1 B06-B10 BOH	Not selected for inclusion in report
L100000E	L1 A01-A03 BOH	Not selected for inclusion in report
L1000010	L1 B11-B13 BOH	Not selected for inclusion in report
L1000011	L1 A04-A07 BOH1	Not selected for inclusion in report
L1000013	L1 A04-A07 BOH2	Not selected for inclusion in report
L1000014	L1 A08 BOH	Not selected for inclusion in report
L1000016	L1 foyer (void)	Not selected for inclusion in report
L1000018	L1 corridor	Not selected for inclusion in report
L2000001	L2 A20-A23 BOH	Not selected for inclusion in report
L2000005	L2 A27-A30 BOH	Not selected for inclusion in report
L2000006	L2 B15-B18 BOH	Not selected for inclusion in report
L2000008	L2 A10-A19 BOH	Not selected for inclusion in report
L200000A	L2 B01-B05 BOH	Not selected for inclusion in report
L200000C	L2 B06-B10 BOH	Not selected for inclusion in report
L200000E	L2 A01-A03 BOH	Not selected for inclusion in report
L2000010	L2 B12-B14 BOH	Not selected for inclusion in report
L2000011	L2 A05-A08 BOH1	Not selected for inclusion in report
L2000013	L2 A05-A08 BOH2	Not selected for inclusion in report
L2000014	L2 A09 BOH	Not selected for inclusion in report
L2000017	L2 corridor	Not selected for inclusion in report
L2000018	L2 A04 BOH	Not selected for inclusion in report
L200001B	L2 B11 BOH	Not selected for inclusion in report
L3000001	L3 A25-A28 BOH	Not selected for inclusion in report
L3000003	L3 A01-A03 BOH	Not selected for inclusion in report
L3000005	L3 B10-B12 BOH	Not selected for inclusion in report
L3000006	L3 A05-A08 BOH1	Not selected for inclusion in report
L3000008	L3 A05-A08 BOH2	Not selected for inclusion in report
L3000009	L3 A09 BOH	Not selected for inclusion in report
L300000B	L3 A04 BOH	Not selected for inclusion in report
L300000E	L3 B09 BOH	Not selected for inclusion in report
L3000010	L3 B01-B03 BOH	Not selected for inclusion in report
L3000012	L3 B04-B08 BOH	Not selected for inclusion in report

L3000013	L3 B13-B15 BOH	Not selected for inclusion in report
L3000016	L3 A10-A18 BOH	Not selected for inclusion in report
L4000001	L4 A18-A21 BOH	Not selected for inclusion in report
L4000003	L4 A01-A03 BOH	Not selected for inclusion in report
L4000005	L4 B07-B09 BOH	Not selected for inclusion in report
L4000006	L4 A05-A08 BOH1	Not selected for inclusion in report
L4000008	L4 A05-A08 BOH2	Not selected for inclusion in report
L4000009	L4 A09 BOH	Not selected for inclusion in report
L400000B	L4 A04 BOH	Not selected for inclusion in report
L400000E	L4 B06 BOH	Not selected for inclusion in report
L400000F	L4 A10-A18 BOH	Not selected for inclusion in report
L4000010	L4 A10-A17 BOH	Not selected for inclusion in report
L4000013	L4 B03-B05 BOH	Not selected for inclusion in report
L4000015	L4 B01, 10-11 BOH	Not selected for inclusion in report
L4000017	L4 corridor	Not selected for inclusion in report
L4000018	L4 B02 BOH	Not selected for inclusion in report
L5000001	L5 A01-A03 BOH	Not selected for inclusion in report
L5000002	L5 A05-A08 BOH1	Not selected for inclusion in report
L5000004	L5 A05-A08 BOH2	Not selected for inclusion in report
L5000005	L5 A09 BOH	Not selected for inclusion in report
L5000007	L5 corridor	Not selected for inclusion in report
L5000009	L5 A16-A19 BOH	Not selected for inclusion in report
L500000A	L5 A10-A15 BOH	Not selected for inclusion in report
L500000D	L5 A04 BOH	Not selected for inclusion in report
L6000001	L6 A01-A03 BOH	Not selected for inclusion in report
L6000002	L6 A05-A08 BOH1	Not selected for inclusion in report
L6000004	L6 A05-A08 BOH2	Not selected for inclusion in report
L6000005	L6 A09 BOH	Not selected for inclusion in report
L6000007	L6 corridor	Not selected for inclusion in report
L6000009	L6 A16-A19 BOH	Not selected for inclusion in report
L600000A	L6 A10-A15 BOH	Not selected for inclusion in report
L600000D	L6 A04 BOH	Not selected for inclusion in report
L200001D	L2 A24-A26 BOH	Not selected for inclusion in report
L3000019	L3 corridor	Not selected for inclusion in report

Calculation Data

Location: Melbourne Moorabbin, Australia(-37.98 N, 214.90 W)
Calculated: 05 May 2021 at 7:58 PM
Sky Model: CIE Uniform Overcast Sky
Working plane height: 0.100m
Grid Size: 0.500m
Illuminance Threshold (%): 2.00

Light Penetration:	With light penetration through internal windows