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waste management plans for all urban developments	

WASTE MANAGEMENT PLAN

Proposed Development: Stage 3

149 and Part of 127–139 Nicholson Street, Brunswick East, Victoria

Prepared for:

Banco Group of Companies

Document Control	
Report Date:	2 July 2020 (supersedes all prior reports)
Prepared By:	Leonardo Russi, BEng (Mech), MEng (Env)

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WASTE MANAGEMENT SUMMARY

- The operator, as defined below, shall be responsible for managing the waste system and for developing and implementing adequate safe operating procedures.
- Waste shall be stored within the development (hidden from external view).
- Residents and commercial tenants shall sort their waste and dispose garbage and recyclables into their respective collection bins.
- Waste shall be collected within the development. The collection contractor shall transfer bins between the storage areas and the waste truck.
- A private contractor shall provide waste collection services.

GLOSSARY

Operator: refers to the Owners Corporation, who shall manage site operations (via staff and contractors, if required).

User: refers to residents, site staff and commercial tenants, who shall utilise the waste system.

1 SPACE AND SYSTEM FOR WASTE MANAGEMENT

1.1 Development Description and Use

This development shall consist of residential apartments and commercial tenancies. The number of residences and commercial floor-areas are stated in Table 1 (below).

1.2 Estimated Garbage and Recycling Generation

The following table summarises the waste estimate (m^3/week):

Table 1: Waste Estimate

Waste Source	Base Qty (est.)		Garbage	Commingled Recycling
Lot 3 Apartments (1 bed)	No. of units =	7	0.42	0.42
Lot 3 Apartments (2 bed)	No. of units =	21	1.68	1.68
Lot 3 Apartments (3 bed)	No. of units =	18	1.44	1.44
Lot 3 Retail Shops	area (m^2) =	1052	3.68	3.68
Lot 3 Medical Suites	area (m^2) =	598	0.90	0.33
Lot 3 Gym / Yoga Studio	area (m^2) =	946	0.95	0.57
Lot 4 Apartments (1 bed)	No. of units =	61	3.66	3.66
Lot 4 Apartments (2-3 bed)	No. of units =	87	6.96	6.96
Lot 4 Retail Shops	area (m^2) =	1374	4.81	4.81
Lot 4 Cinema	area (m^2) =	954	1.24	0.29
Lot 8 Offices	area (m^2) =	2550	1.79	1.91
Lot 9 Apartments (1 bed)	No. of units =	34	2.04	2.04
Lot 9 Apartments (2 bed)	No. of units =	24	1.92	1.92
Lot 10 Apartments (1 bed)	No. of units =	9	0.54	0.54
Lot 10 Apartments (2 bed)	No. of units =	30	2.40	2.40
Lot 10 Apartments (3 bed)	No. of units =	5	0.40	0.40
TOTAL (m^3/wk)			**34.82**	**33.05**

Note: Waste figures are based on adjusted Sustainability Victoria Guidelines.

1.3 Collection Services

Residential Waste: The municipal wheelie bin service would be unsuitable due to the insufficient kerbside length for the estimated 175 wheelie bins.

Commercial Waste: Municipal services would be insufficient as these are limited to a pair of weekly wheelie bins per tenement. Therefore, a private contractor shall be engaged to collect waste.

For both residential and commercial waste, the operator shall choose a waste collection provider, negotiate a service agreement, and pay for these services.

Note: Every rateable tenement is liable to pay for municipal charges irrespective of the level of collection services provided by Council.

1.4 Location, Equipment, and System Used for Managing Waste

The waste management system is summarised as follows:

- Apartment receptacles for garbage and recycling.
- Tenancy receptacles at work/amenity areas.
- Lot 3 and Lot 10 Residential Bin Stores located at Basement Level 1.
- Lot 4 and Lot 9 Residential Bin Stores located at Basement Level 2.
- Lots 3, 4 and 8 Commercial Bin Stores located at Basement Level 1.
- Hard Waste Rooms at Basement Levels 1 and 2.
- Collection bins (kept within the above bin storage areas - refer to Table 2).

The various collection waste-streams are summarised as follows:

Garbage: General waste shall be placed in tied plastic bags and stored within bins.

Recycling: All recyclables shall be commingled into a single type of collection bin (for loose paper, cardboard, PET, glass, aluminum, steel, and HDPE containers).

Green Waste: Garden organics shall be collected and disposed by the future landscape maintenance contractor.

Compost: At this development, composting is considered impractical, as there would be minimal onsite demand for compost.

Clinical Waste: Clinical waste (medical, infectious, cytotoxic, sharps, chemical, pharmaceutical, radioactive, etc) shall be managed in accordance with the Industry Code of Practice for the Management of Biohazardous Waste (including Clinical & Related wastes, 7th edition, 2014). A specialist clinical waste contractor shall be engaged to implement the code, provide facility design and operational details (incl. a Clinical WMP) for the safe handling and disposal of clinical waste, and for waste collection and treatment (refer to suggested contacts in Sect. 6).

A suitable Clinical Waste Store shall be provided (store size/design and all clinical waste streams/bins shall be specified by a specialist consultant).

Office Waste:

- For the security of information printed on waste paper (intellectual property, sensitive material, and/or personal details), paper bins shall remain within each office (adjacent the photocopier or in the stationery cupboard) until transferred to a secured collection point (or swapped in-situ by a shredding/recycling contractor). Alternatively, office managers may utilise a paper shredder and dispose waste into the paper/cardboard bins (kept within Lot 8 Bin Store).
- Office managers shall store spent printer/toner cartridges until collected for recycling by the cartridge supplier.
- Office managers shall encourage the recycling of electronic waste (computers and printers). The computer supplier or a suitable contractor shall be engaged to recycle/reuse outgoing units when supplying new ones.

Other Waste Streams: The disposal of hard/electronic/liquid waste, and home detox (paint/chemicals), etc shall be organised with the assistance of the operator.

The following table summarises bin quantity/capacity, collection frequency, and area requirements (based on Table 1):

Waste Source	Waste Stream	Bin Qty	Bin Litres	Collections per Week	Bin Area m^2
Lot 3 Residential (shared bins)	Garbage	2	660	3	2.4
	Recycling	2	660	3	2.4
Lot 3 Commercial (shared bins)	Garbage	3	660	3	3.6
	Recycling	3	660	3	3.6
Lot 3	Hard/Other Waste	-	-	TBA	3.0
Lot 4 Residential (shared bins)	Garbage	6	660	3	7.2
	Recycling	6	660	3	7.2
Lot 4 Commercial (shared bins)	Garbage	3	660	3	3.6
	Recycling	3	660	3	3.6
Lot 4	Hard/Other Waste	-	-	TBA	3.0
Lot 8 (shared bins)	Garbage	1	660	3	1.2
	Recycling	1	660	3	1.2
	Hard Waste	-	-	TBA	1.0
Lot 9 (shared bins)	Garbage	2	660	3	2.4
	Recycling	2	660	3	2.4
	Hard Waste	-	-	TBA	1.0
Lot 10 (shared bins)	Garbage	2	660	3	2.4
	Recycling	2	660	3	2.4
	Hard Waste	-	-	TBA	1.0
Net Bin Storage Area (excludes circulation), m^2:					**54.6**

Notes:

- Should waste office paper require confidential disposal, tenants shall organise 120 litre private secured paper bins (kept within each office and at each level).
- The operator shall organise hard waste collections (as required).
- Private bins shall be sourced by the operator (either purchased from a supplier or leased from the collection contractor).
- Subject to stakeholders' preference/capability (and as built constraints), bin sizes and quantities can be changed. Also, recyclables can be either commingled or split into bins for separate recycling streams.

1.5 Planning Drawings, Waste Areas, and Management of the Waste System

The plans shall illustrate sufficient space for onsite bin storage, as required by the above schedule.

Notwithstanding the above, collection days shall be staged appropriately and the operator shall stipulate procedures for effective management of the available space.

1.6 Collection Bin Information

The following bins shall be utilised (see Sect. 4.3 for signage requirements):

Table 3: Bin Details

Capacity (litres)	Height (mm)	Width (across front, mm)	Depth (side on, mm)	Empty Weight (kg)	Average* Gross Weight (kg)
120	930	480	545	10	26
660	1250	1240	780	43	130

Notes:

- * = Average Gross Weight is based on domestic waste studies (which vary subject to locality and waste-type). Expect greater weight for wet or compacted waste.
- Use the above details as a guide only – variations will occur. The above is based on Sulo plastic (HDPE) bins.

Table 4: Moreland Colour Coding

Bin	Garbage	Commingled Recycling	Green Waste
Lid	Green	Yellow	Lime
Body	Green	Green	Green

Note: For private bins, AS4123.7 bin colours can be adopted. Private bins shall be labeled to identify the waste generator and site address.

2 ACCESS FOR USERS, COLLECTORS, AND COLLECTION VEHICLES

2.1 User Access to Waste Facilities

Residents and commercial tenants shall dispose sorted garbage and recyclables into their respective collection bins located within the Bin Stores (access via lifts/stairs).

Note: The operator shall have access to the Bin Stores to rotate the bins, ensuring that empty bins are available along the circulation area so that users are able to reach them.

2.2 Collection Arrangements and Access to Waste Facilities

- A private contractor shall collect waste within the onsite carpark at Basement Levels 1 and 2.
- Collection staff (driver and assistant) shall have access to the Bin Stores and transfer bins to the truck and back to the stores.
- Waste bins shall be collected by rear-lift vehicles (nom. 6.4m long, 2.1m high, and 6.4 tonnes gross vehicle mass, needing a 2.3m high clearance when collecting 660-lt bins).

3 AMENITY, LOCAL ENVIRONMENT, AND FACILITY DESIGN

3.1 Noise Minimisation Initiatives

- Collection bins shall feature rubber castors for quiet rolling during transfers.
- Waste areas shall meet BCA and AS2107 acoustic requirements.
- Local laws shall be observed for all operations in public and private areas.
- Site operations (including loading, unloading, and waste collections) must comply with State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1.
- For private services, the hours of waste collections shall be as specified in council's local laws. Also, Section 5 of the Victorian EPA Noise Control Guideline Publication 1254 (see below) shall be observed to protect the acoustic amenity of the development and surroundings.

Victorian EPA Noise Control Guideline Publication 1254 October 2008 (excerpt)

[Section] 5. Domestic [and Commercial] Refuse Collection

The main annoyance produced by domestic refuse collections occurs in the early morning (i.e. before 7:00am). Therefore, if possible, routes should be selected to provide the least impact on residential areas during that time.

Collection of refuse should be restricted to the following criteria:

- Collection occurring once a week should be restricted to the hours: 6am to 6pm Monday to Saturday.
- Collections occurring more than once a week should be restricted to the hours: 7am to 6pm Monday to Saturday.
- Compaction should only be carried out while on the move.
- Bottles should not be broken up at the point of collection.
- Routes which service entirely residential areas should be altered regularly to reduce early morning disturbance.
- Noisy verbal communication between operators should be avoided where possible.

3.2 Litter Reduction and Prevention of Stormwater Pollution

The operator shall be responsible for:

- Promoting adequate waste disposal into the bins (to avoid waste-dumping).
- Securing the waste areas (whilst affording access to users/staff/contractors).
- Preventing overfilled bins, keeping lids closed and bungs leak-free.
- Abating any site litter and taking action to prevent dumping and/or unauthorised use of waste areas.
- Requiring the collection contractor to clean-up any spillage that might occur when clearing bins.

The above will minimise the dispersion of site litter and prevent stormwater pollution (thus avoiding impact to the local amenity and environment).

3.3 Ventilation, Washing, and Vermin-Prevention Arrangements

Waste areas shall feature:

- Ventilation in accordance with Australian Standard AS1668.
- Impervious flooring (also, smooth, slip-resistant, and appropriately drained).
- A graded bin wash area, hot and cold mixing hosecocks, hose, and a suitable floor-waste connected in accordance with the relevant authority requirements. The bin and wash areas may overlap, as stored bins can be moved-out so that a bin can be washed.

The operator shall regularly clean waste areas/equipment. Also, bin-lids shall be kept closed.

3.4 Design and Aesthetics of Waste Storage Areas and Equipment

Waste shall be placed within collection bins and stored in designated onsite areas (hidden from external view). Following waste collection activities, bins shall be returned to the storage areas as soon as practicable.

Waste facilities shall be constructed of durable materials and finishes, and maintained to ensure that the aesthetics of the development are not compromised. These facilities and associated passages shall be suitably illuminated (this provides comfort, safety, and security to users, staff, and contractors). Any access doors shall feature keyless opening from within.

The design and construction of waste facilities and equipment shall conform to the Building Code of Australia, Australian Standards, and local laws.

4 MANAGEMENT AND SUSTAINABILITY

4.1 Waste Sorting, Transfer, and Collection Responsibilities

Garbage shall be placed within tied plastic bags prior to transferring into the collection bins. Cardboard shall be flattened and recycling containers un-capped, drained, and rinsed prior to disposal into the appropriate bin. Bagged recycling is not permitted.

Refer to Section 2 for waste transfer requirements and collection arrangements.

4.2 Facility Management Provisions to Maintain & Improve the Waste System

The operator shall manage site operations (refer to the glossary in page 2).

It shall be the responsibility of the operator to maintain all waste areas and components, to the satisfaction of users, staff, and the relevant authority (users shall maintain their internal waste receptacles).

The operator shall ensure that maintenance and upgrades are carried-out on the facility and components of the waste system. When required, the operator shall engage an appropriate contractor to conduct services, replacements, or upgrades.

4.3 Arrangements for Protecting Waste Equipment from Theft and Vandalism

It shall be the responsibility of the operator to protect the equipment from theft and vandalism. This shall include the following initiatives:

- Secure the waste areas.
- Label the bins according to property address.
- Waste shall be collected within the subject site.

4.4 Arrangements for Bins/Equipment Labelling and Ensuring Users and Staff are Aware of How to Use the Waste System Correctly

- The operator shall provide appropriate signage for the bins. Signage is available at the following internet address: www.sustainability.vic.gov.au.
- The operator shall publish/distribute “house rules” and educational material to:
  - Inform users/staff about the waste management system and the use/location of the associated equipment (provide the summary in page 2 of this report).
  - Improve facility management results (lessen equipment damage, reduce littering, and achieve cleanliness).
  - Advise users/staff to sort and recycle waste with care to reduce contamination of recyclables.

4.5 Sustainability and Waste Avoidance/Reuse/Reduction Initiatives

The *Environment Protection Act 1970* includes principles of environment protection and guidance for waste management decision making. Also, the *Sustainability Victoria Act 2005* established Sustainability Victoria as the statutory authority for delivering programs on integrated waste management and resource efficiency.

From a design perspective, the development shall support the acts by providing an adequate waste system with ability to sort waste.

The operator shall promote the observance of the acts (where relevant and practicable) and encourage users and staff to participate in minimising the impact of waste on the environment. For improved sustainability, the operator shall consider the following:

- Observe the waste hierarchy in the *Environment Protection Act 1970* (in order of preference): a) waste avoidance, b) reuse, c) recycle, d) recovery of energy, e) treatment, f) containment, and g) disposal.
- Peruse the Sustainability Victoria website: www.sustainability.vic.gov.au.
- Participate in Council and in-house programs for waste minimisation.
- Establish waste reduction and recycling targets; including periodic waste audits, keeping records, and monitoring of the quantity of recyclables found in landfill-bound bins (sharing results with users/staff).

4.6 Waste Management Plan Revisions

For any future appropriate council request, changes in legal requirements, changes in the development's needs and/or waste patterns (waste composition, volume, or distribution), or to address unforeseen operational issues, the operator shall be responsible for coordinating the necessary Waste Management Plan revisions, including (if required):

- A waste audit and new waste strategy.
- Revision of the waste system (bin size/quantity/streams/collection frequency).
- Re-education of users/staff.
- Revision of the services provided by the waste collector(s).
- Any necessary statutory approval(s).

5 SUPPLEMENTARY INFORMATION

- The operator shall ensure that bins are not overfilled or overloaded.
- Waste incineration devices are not permitted, and offsite waste treatment and disposal shall be carried-out in accordance with regulatory requirements.
- For bin traffic areas, either level surfaces (smooth and without steps) or gentle ramps are recommended, including a roll-over kerb or ramp. Should ramp gradients, bin weight, and/or distance affect the ease/safety of bin transfers, the operator shall consider the use of a suitable tug.
- The operator and waste collector shall observe all relevant OH&S legislation, regulations, and guidelines. The relevant entity shall define their tasks and:
  - Comply with Worksafe Victoria's Occupational Health and Safety Guidelines for the Collection, Transport and Unloading of Non-hazardous Waste and Recyclable Materials (June 2003).
  - Assess the Manual Handling Risk and prepare a Manual Handling Control Plan for waste and bin transfers (as per regulatory requirements and Victorian COP for Manual Handling).
  - Obtain and provide to their staff/contractors equipment manuals, training, health and safety procedures, risk assessments, and adequate personal protective equipment (PPE) to control/minimise risks/hazards associated with all waste management activities. As a starting point, these documents and procedures shall address the following:

Task (to be confirmed)	Hazard (TBC)	Control Measures (TBC)
Sorting waste and cleaning bins	Biological hazard & bodily puncture	Personal protective equipment (PPE). Develop a waste-sorting procedure
Bin manual handling	Sprain, strain, crush	PPE. Maintain bin wheel-hubs. Limit bin weight. Provide mechanical assistance to transfer bins
Bin transfers and emptying into truck	Vehicular strike, run-over	PPE. Develop a hazard control plan and collection procedure. Maintain visibility. Use a mechanical bin-tipper
Truck access (reversing & manoeuvring)	Vehicular incident, strike, run-over	PPE. Use a trained spotter. Develop a truck-manoeuvring and traffic-control procedure

Note: The above shall be confirmed by a qualified OH&S professional who shall also prepare site-specific assessments, procedures, and controls (refer to Section 6).

6 CONTACT INFORMATION

Moreland City Council (local council), ph 03 9240 1111

Waste Wise Environmental (private waste collector), ph 03 9359 1555

Kartaway (private waste collector), ph 1300 362 362

Recall SDS (office paper recycler), ph 1300 366 011

Paper To Paper Australia (office paper recycler), ph 1300 727 377

Cleanaway Medi-Waste (clinical waste collector), ph 9551 3833

SteriCorp Limited (clinical waste collector), ph 1300 667 787

FJP Safety Advisors Pty Ltd (OH&S consultant), ph 03 9255 3660

Electrodrive Pty Ltd (tug & trailer supplier – for bin transfers), ph 03 9357 7699

Sabco Commercial (supplier of cleaner's trolleys), ph 1800 066 522

Sulo MGB Australia (bin supplier), ph 03 9357 7320

One Stop Garbage Shop (bin supplier), ph 03 9338 1411

Note: The above includes a complimentary listing of contractors and equipment suppliers. The stakeholders shall not be obligated to procure goods/services from these companies. Leigh Design does not warrant (or make representations for) the goods/services provided by these suppliers.

7 LIMITATIONS

The purpose of this report is to document a Waste Management Plan, as part of a Planning Permit Application.

This report is based on the following conditions:

- Operational use of the development (excludes demolition/construction stages).
- Drawings and information supplied by the project architect.
- The figures presented in this report are estimates only. The actual amount of waste will depend on the development's occupancy rate and waste generation intensity, the user's disposition toward waste and recycling, and the operator's approach to waste management. The operator shall make adjustments, as required, based on actual waste volumes (if the actual waste volume is greater than estimated, then the number of bins and/or the number of collections per week shall be increased, STCA).
- This report shall not be used to determine/forecast operational costs, or to prepare feasibility studies, or to document operational/safety procedures.

PHILIP CHUN
Building Compliance

Mixed Use Development

127-137, 139 & part 149 Nicholson Street, Brunswick East – Stage 3, Lots 3, 4, 8, 9 & 10 (S72 application)

Town Planning Stage Accessibility Report –

Report Prepared for: Jam Architects
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Attention: Stephen Lightbody

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Client Reference: Project no: 1416

Our Project no: AV15-205142 (AV020-013759)

Our Reference: AV15-205142_AV20-013759_20200714_APR_LW.docx

Date: 14 July 2020

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DOCUMENT ACCEPTANCE

	Name	Signed	Date
Prepared by	Lynda Wilem *Senior Access Consultant* *ACAA Accredited member No. 353*		14 July 2020

REVISION HISTORY

Revision No.	Prepared by	Description	Date
00	Lynda Wilem	For Town Planning	29 September 2016
01	Dennisse Bonanno	For Town Planning	27 November 2018
02	Lynda Wilem	For Town Planning (Section 72 application)	14 July 2020

This report has been prepared based on the available time allocated to conduct the review, and all reasonable attempts have been made to identify key compliance matters pursuant to the Building Code of Australia 2016 (BCA) and additional issues which have been deemed an impediment to access provision and may increase Client risk of attracting a complaint under the Disability Discrimination Act 1992 (Cth) (DDA). The information provided within this report is relevant to this project and the documentation referenced. As such the information provided may not be transferred to other projects. This report must not be issued for public comment or be used for any other purpose without prior permission from Philip Chun Access.

Philip Chun Access accepts no responsibility for any loss suffered as a result of any reliance upon such assessment or report other than providing guidance to alleviate access barriers in the built environment and reduce Client risk of attracting a complaint under the DDA.

1. EXECUTIVE SUMMARY

This accessibility report represents a review of proposed mixed use development at 127-137, 139 & part 149 Nicholson Street, Brunswick East – Stage 3: Lots 3, 4, 8, 9 and 10. This report has been further amended to support the Section 72 application changes relevant to Lots 3 and 4 of the project.

This report addresses all aspects of access to and within the site with respect to the Building Code of Australia (BCA), Disability Discrimination Act 1992 (Cth) (DDA), and relevant Australian Standards as applicable to this project and confirms accessibility has been addressed in the associated planning documentation and confirms the Client's commitment to the development of an equitable and accessible environment for all.

This report confirms that not less than 10% of the project apartments have been appropriately designed as adaptable apartments.

The proposed development is capable of achieving access for people with disabilities and meeting relevant standards. The finer details with respect to BCA compliance may be finalised prior to the issue of a Building Permit.

2. INTRODUCTION

Philip Chun Accessibility provides the following professional opinion in regards to access for people with disabilities to and throughout the proposed mixed use development at 127-137, 139 & part 149 Nicholson Street, Brunswick East – Stage 3: Lots 8, 9 and 10, and, Lots 3 and 4 (per the applicable Section 72 changes).

This accessibility report has been prepared for Jam Architects and represents a review of all aspects of access to and within the site with respect to the Building Code of Australia (BCA), Disability Discrimination Act 1992 (Cth) (DDA), and relevant Australian Standards as applicable to this project. This report confirms accessibility has been appropriately addressed in the associated planning documentation and confirms the Client's commitment to the development of an equitable and accessible environment for all.

Philip Chun Accessibility permits submission of this report to the relevant authority, City of Moreland, to satisfy planning requirements.

2.1 Site and Contexts

The proposed project is a mixed-use development located at 125-137, 139 and part 149 Nicholson Street extending through to Elm Grove at Brunswick East. The development proposal incorporates:

- 6 levels of Class 2 apartments (extending from the ground level to the fifth floor),
- residential and commercial car parking (at basement levels, and some on ground); and,
- retail and office tenancies.

2.2 Reviewed Documentation

The town planning documentation prepared by Jam Architects (Job No. 1416) as listed in Appendix A was reviewed as part of our assessment.

- Initial set revision S-27.09.2018 received on 5th October 2018.
- Updated revision S-23.11.2018 received on 23rd November 2018.
- Updated revision dated 6/19/2020 received on 22nd June 2020.
- Updated revision received on 10th July 2020.
- Updated drawing TP83, dated 14th July 2020.

3. DISABILITY DISCRIMINATION ACT

3.1 Disability Discrimination Act

The Disability Discrimination Act 1992 (Cth) (DDA) states it is unlawful to discriminate on the basis of disability, protecting persons with disability and their associates. Section 23 of the DDA relates to access to premises and facilities which the public may enter or use, and states it is unlawful to:

a) Refuse access to, or the use of, any premises, or the facilities within them.
b) Impose terms or conditions specific to persons with disability and their associates on the access and use of any premises or facilities;
c) Exclude access based on the provision of an appropriate means of access;
d) Request persons with disability or their associates to leave premises or cease use of facilities.

The DDA also addresses discrimination in other areas, including:

a) In employment (Sections 15 to 21);
b) Provision of goods, services and facilities (Section 24);
c) Accommodation (Section 25);
d) Land (Section 26).

In contrast to building regulations, the DDA is not prescriptive and previously, there was a lack of uniformity between the building regulations in each State and Territory and the DDA. Since the DDA, it became evident that compliance with the Building Code of Australia (BCA) was insufficient to meet the objectives of the DDA. However subsection 31(1) of the DDA permits the development of Disability Standards, leading to the implementation of the Disability (Access to Premises - Buildings) Standards 2010 (Premises Standards) and Disability Standards for Accessible Public Transport 2002 (DSAPT). It is unlawful to contravene the Disability Standards, however if the Disability Standards are met, those responsible for the building cannot be subject to a successful complaint for the matters covered by the Standards.

The implementation of the Premises Standards, and corresponding changes to the BCA, is a significant step towards achieving equal access to premises and is crucial to justice and social inclusion for people with disabilities. The Premises Standards will assist in the creation of a more sustainable built environment which is responsive to the changing circumstances of the wider Australian community.

It is noted that the Premises Standards are limited in scope, covering aspects of building compliance applicable under the BCA. It is acknowledged that the Premises Standards could address a broader range of accessibility issues including considerations to accessibility of parkland, playgrounds, transport vehicles, interior fit-out of buildings, and fixtures and fittings. As such, there are features which fall beyond the scope of the Standards which may be subject to the general complaints provisions of the DDA.

In this assessment, Philip Chun will refer, not only to the Disability (Access to Premises - Buildings) Amendment Standards 2010 (No. 1), but to additional Accessibility Standards in draft and current Australian Standards, to meet the spirit and intent of the DDA and to ensure best practice principles are applied for this project. A full list of references for this report is available upon request.

4. ACCESS PROVISION

The following areas of the development will be accessible by residents, employees and visitors, excluding maintenance and storage facilities, enabling safe, equitable and independent travel.

4.1 Car Parking Provisions

An internal, undercover car park is proposed at basement levels 1 and 2. As well as a row of externally exposed car spaces also proposed on the ground floor within lot 4. The car park works are understood to be all inclusive of stages 1, 2, and 3, but constructed under stage 1 works. A total of one thousand, one-hundred and eighty (1180) car parking spaces are proposed in the following configuration (based on the noted class assumptions):

- (810) car parking spaces to serve the residential (Class 2) component of the development.
- Two-hundred and eighty-two (282) car parking spaces to serve the retail (Class 6) component of the development.
- Twenty-six (26) car parking spaces designated to medical centre (class 5)
- Sixty-two (62) car spaces for offices (class 5)

Eight (8) accessible car parking spaces shall be provided to serve the commercial components of the development, which is understood to be sufficient to meet the requirements of BCA Part D3.5.

It should be noted that distribution is to designated per ratio of car spaces set by planning requirements.

The accessible car parking spaces have been appropriately designed in accordance with AS 2890.6 (2009), including the provision of head height clearance in accordance with AS 2890.6 (2009) Clause 2.4. That is, head height clearance to be provided between the car park floor and any overhead obstruction of not less than 2200mm between the car park entrance, accessible parking spaces and the car park exit; and, the head height clearance at the accessible car parking spaces and adjacent shared spaces shall be not less than 2500mm from the entrance of the space to a distance of no less than 1000mm from the front of the space, where the height may be reduced to no less than 2200mm, and, to not less than 1800mm within 500mm from the front of the space (AS 2890.6:2009 Figure 2.7).

The gradient and crossfall of the accessible car parking spaces and associated shared spaces shall be no steeper than 1:40.

There are no accessible car parking spaces required to be provided to the residential (Class 2) component of the development to meet BCA Part D3.5.

4.2 External Pedestrian Paths of Travel

The site is located on Nicholson Street (to the east), with Elm Grove located to the rear (west) of the site.

Continuous, accessible pedestrian paths of travel shall be provided to and throughout the site in accordance with BCA Part D3.2 and AS 1428.1 (2009).

Where pedestrian ramps (gradient 1:14 – 1:20) and walkways (gradient 1:20 – 1:33) are provided, they shall meet AS 1428.1 (2009) Clause 10. The crossfall to pedestrian paths of travel shall be no steeper than 1:40.

External pedestrian paths of travel shall incorporate the use of contrasting surface materials to assist the orientation and mobility of people with a visual impairment.

Where external ramps and stairs are provided, they shall fully meet AS 1428.1 (2009) including the provision of compliant handrails, kerbs, warning tactile ground surface indicators and stair nosings as required to meet AS 1428.

Warning tactile ground surface indicators to be installed in accordance with AS 1428.4.1 (2009) to all stairs, escalators, ramps, and, where pedestrian accessways meet a vehicular roadway at grade.

4.3 Building Entrances and Internal Doors

Residential and retail tenancy entrances shall be accessed via Nicholson Street, Elm Grove, and, the pedestrian accessways proposed which shall extend north/south and east/west through the site.

Each residential block and commercial tenancy shall be provided with entrance doors meeting BCA Part D3.2 and AS 1428.1 (2009) including: provision of a clear opening door width of not less than 850mm (including to the active leaf of double doors), door operating forces (to manual doors) not exceeding 20N/20N/20N, and, the provision of door circulation space per AS 1428.1 (2009) Clause 13.3.

Each accessible entrance shall be at grade, or alternatively, ramps shall be provided in accordance with AS 1428.1 (2009) Clause 10.

All entry doors to the nominated adaptable units will enable independent access by all users, including clear opening widths of not less than 850mm to the operable leaf (minimum 920mm door leaf width) and appropriate circulation space for operation, per AS 1428.1 (2009) Clause 13.3.

Entry doors to all other units will possess clear opening widths of not less than 850mm to the operable leaf (minimum 920mm door leaf width) to ensure units are visitable by people with disabilities. It is assumed that in this instance, visitors will be greeted at the entry door and there will be assistance available if required, therefore circulation space has not been provided.

Internal doors to all remaining areas of the development, including tenancy amenities, will possess clear opening widths of not less than 850mm to the operable leaf (minimum 920mm door leaf width) to enable access by all.

Door hardware and any security measures will be selected and installed to comply with the requirements of AS 1428.1 (2009). Where doors (required to be accessible) do not achieve the circulation space requirements of AS 1428.1 (2009) Clause 13.3, they shall be automated or power operated.

4.4 Internal Paths of Travel

A continuous accessible path of travel, by means of a passenger lift, shall be provided to the commercial tenancies and entry to each unit above ground level, ensuring visitability by people of all abilities.

Common areas of the residential component of the development (including rubbish, storage and outdoor areas) and all areas of the commercial component (excluding service and maintenance areas), shall be accessible and corridors will be provided with corridors of sufficient width, and, turning and passing spaces which meet the requirements of the BCA and the Disability (Access to Premises - Buildings) Standards No. 1 (2010).

Typically, corridor widths of not less than 1600m shall be achieved to the residential component of the development and not less than 1200mm to the commercial component of the development.

Sufficient circulation space shall be provided to the front of each passenger lift on every floor to facilitate completion of a 90-degree turn by a wheelchair user (AS 1428.1:2009) (i.e. not less than 1500mm x 1500mm).

Finished surfaces, including wall, floor and door finishes will be selected to ensure adequate definition for people with varying degrees of vision impairment, such as minimum 30% luminance contrast between door and door frame, or door frame and adjacent wall. Appropriate visual indication which meets the compliance criteria of AS 1428.1 (2009) will be installed to all frameless or fully glazed doors and sidelights, and any glazing which may be mistaken for a doorway or opening.

4.5 Commercial Tenancies

This report is applicable to the base building works of commercial tenancies within the project.

Philip Chun Access understands that floor, ceiling and column finishes will be provided by the tenant. Any requirements within the tenancy should be the responsibility of the individual tenant. The lease agreement should clearly stipulate that all finishes be selected with consideration to the relevant Australian Standards and the spirit and intent of the DDA.

This policy will allow each individual tenant to design their space to suit their needs with relevant access features for people with disabilities.

4.6 Accessible Sanitary Faculties

Each commercial tenancy shall be served by a unisex accessible sanitary facility.

The internal dimensions and layout of the accessible facility will be appropriate to ensure circulation of not less than 1900mm X 2300mm to the pan, in accordance with AS 1428.1 (2009) Clause 15. The washbasin will not encroach greater than 100mm into this space.

All accessible facilities will be designed and constructed with appropriate selection and placement of fixtures and fittings which enable access by all users and meet the compliance requirements of AS 1428.1 (2009).

4.7 Stairs

A number of fire-isolated egress stairs and communication stairs are proposed to the development.

Fire-isolated stairs, proposed for emergency egress only, shall be installed with provisions to meet minimum building code requirements, including a balustrade to the open side, visual indication to stair nosings and non-slip treads. The Disability (Access to Premises - Buildings) Standards No. 1 does not require additional components where the stair is fire-isolated and unlikely to be used for general communication between floors.

All communication stairs shall fully comply with the requirements of AS 1428.1 (2009) Clause 11, including handrails to both sides with appropriate height, dimensions, profile and extensions, opaque risers, no overhanging treads, visual indication to stair nosings and tactile ground surface indicators (per AS 1428.4.1:2009).

4.8 Passenger Lifts

Thirteen (13) passenger lifts are proposed to serve the residential and commercial components of the development, extending from basement level 2 to the fifth floor. Passenger lift shall have internal floor dimensions of not less than 1400mm x 1600mm to meet BCA Part E3.6.

The lift will consist of enhanced features for people with disabilities to meet the parameters of AS 1735.12 (1999), including however not limited to, handrails, tactile and Braille lift landing and car controls, and visual and audible lift arrival indication.

4.9 Sole-Occupancy Units

A total of two hundred and ninety-six (296) sole-occupancy units are proposed within the residential development, including thirty-two (32) adaptable units.

The following apartments have been nominated as adaptable for accessibility:

- Lot 3 – L3 2.05, L3, 2.14, L3 3.03, L3 3.12, L3 4.03, L3, 4.12

- Lot 4 – L4 1.14, L4 1.20, L4 1.21, L4 1.22, L4 2.15, L4 2.22, L4 2.23, L4 3.15, L4 3.22, L4 3.23, L4 4.15, L4 4.22, L4 4.23, L4 5.15, L4 5.22, L4 5.23
- Lot 9 – L9 0.02, L9 0.07
- Lot 10 – L10 2.01, L10 3.01, L10 4.01, L10 5.01

This report confirms that not less than 10% of the apartments have been appropriately designed as adaptable apartments.

All adaptable units will achieve full compliance with the accessibility requirements for sole-occupancy units under the BCA, including apartment entrance and internal doors with minimum clear opening widths of 850mm and circulation space per AS 1428.1 (2009). The internal dimensions of the bedroom(s) and bathroom(s) will facilitate future access by a wheelchair user with minor modifications only.

Minor modifications may be required in the future, however are limited to elements which required adaptation to meet individual need, and all reasonable attempts have been made to address key accessibility matters pursuant to the BCA and Disability (Access to Premises - Buildings) Standards, which may impede access by a person with a disability.

Additional provisions have been accommodated to facilitate ease of modification in the future, including ceiling framing in the bedroom and bathroom will be structurally adequate for future installation of a ceiling hoist. Structural support will be provided within the bathroom to facilitate future installation of grabrails.

Adaptable Apartments

It is noted that Class 2 residential developments do not require the provision of accessible units to meet the BCA. However Philip Chun Access recommends apartments which have been designed to enable ease of adaptability by residents in the future. Adaptable units permit more flexible kitchen design, do not require the installation of grabrails within bathrooms initially (but facilitate the future installation of grabrails by the provision of structural support within bathroom walls), and allow for the installation of additional, removable storage within circulation areas (such as a vanity unit within the bathroom). Philip Chun Access understands this to be in line with Moreland's approach on similar residential developments, where greater focus has been on achieving a higher percentage of adaptable units than fully accessible. In this instance, not less than 10% of total units have been designed to adaptable principles.

Entrances and Internal Doors

All adaptable units will be designed to enable access to and through the main entrance with clear opening widths to entrances of not less than 850mm and appropriate circulation space (refer Building Entrances and Internal Doors). In regards to internal doors, each will possess appropriate clear opening width and circulation space.

Bedroom

The main bedroom within the adaptable units will possess sufficient circulation space to permit movement by a wheelchair user, being not less than 1540mm X 2070mm clear circulation to at least one side and/or base of a queen size bed. Ceiling framing which is structurally adequate for future installation of a ceiling hoist.

Window sills within the bedroom and living areas will be a maximum of 730mm above finished floor level to enable viewing by persons in the seated position and persons of small stature (AS 4299:1995 Clause 4.7.2).

Bathroom

At least one bathroom within each adaptable unit is sufficient in width and/or length to enable ease of adaptability in the future. Typically, the dimensions achieved are approximately 2400mm (width) X 2700mm (length), generally in accordance with AS 1428.1 (2009).

Structural support (such as structural ply sheeting) is to be provided at toilet and shower grab rail zones to allow for ease of installation of any future fixings. Whilst a vanity unit may be installed, this could be removed to enhance circulation as required. Generally, unit bathrooms have been designed within the pan and shower in the appropriate location for compliant circulation space.

Laundry

Laundry facilities and joinery will be designed to allow for easy removable or relocation to cater for accessibility in the future. Sufficient circulation space has been provided in front of the fixtures.

Kitchen

The kitchen facilities have been located and designed to achieve a minimum clearance of 1540mm between joinery, including opposing walls, cabinets and appliances to facilitate completion of a 180 degree turn by a wheelchair user.

Balcony

The width of the balconies to adaptable units is 1540mm or greater which will permit access to these spaces and facilitate completion of a 180 degree turn by wheelchair user. Internal and external surfaces will be designed and constructed at grade to enable access by all. Where waterproofing is a concern a maximum threshold of 35mm will be provided, with a 1:8 graded ramp abutting the door (with a maximum length of 280mm). Alternatively, consideration will be given to a raised, permeable balcony surface, such as decking which will not impede drainage.

Visitable

It is understood that the City of Moreland Structure Plan defines visitable as “housing that can allow all people to enter a home, navigate through the ground or entry level and to a bathroom suitable for universal use. It should include a suitable bedroom on the ground or entry level to allow for an overnight stay”.

For this development, all units, other than those which have been designed to be adaptable, will possess appropriate clear opening width to the entry door to permit assisted access by a wheelchair user. In the majority of cases, at least one bedroom is sufficient in size to permit an overnight stay, however the bathroom facilities have not been designed for universal use. Philip Chun interprets universal use as requiring sufficient circulation space to the fixtures installed, which would require an increased facility size and would limit the fit-out design.

4.10 Signage

Limited documentation is available at this stage regarding the proposed way-finding strategy for the development.

When the development design progresses, it is recommended that a comprehensive review be undertaken to ensure signage is designed and installed with predictability and consistency of information, facilitating safe, independent and dignified travel by all.

The way-finding strategy should be developed with consideration to landmarks and visual architectural features, including the use of varied surfaces to differentiate areas of the building, including amenities, lobby areas and to identify unit and tenancy entrances.

Tactile and Braille signage shall be provided to meet the compliance requirements of the BCA and provisions outlined in AS 1428.1 (2009), including additional signage where deemed appropriate.

APPENDIX A

DOCUMENTATION REVIEWED

PROJECT/
PROPOSED MIXED USE DEVELOPMENT

DRAWINGS/
PLANNING APPLICATION - STAGES 1 & 3

DRAWING LIST/

01	COVER PAGE
02	LOCATION PLAN AND DEVELOPMENT SUMM...
03	BASEMENT 2 PLAN
04	BASEMENT 1 PLAN
05	GROUND FLOOR SITE PLAN
06	FIRST FLOOR SITE PLAN
07	SECOND FLOOR SITE PLAN
08	THIRD FLOOR SITE PLAN
09	FOURTH FLOOR SITE PLAN
10	FIFTH FLOOR SITE PLAN
11	ROOF SITE PLAN
12	BASEMENT 2 DETAIL PLAN PART A
13	BASEMENT 2 DETAIL PLAN PART B
14	BASEMENT 1 DETAIL PLAN PART A
15	BASEMENT 1 DETAIL PLAN PART B
16	GROUND FLOOR DETAIL PLAN LOTS 1 & 2
17	GROUND FLOOR DETAIL PLAN LOTS 3, 4, 8, ...
18	FIRST FLOOR DETAIL PLAN LOTS 1 & 2
19	FIRST FLOOR DETAIL PLAN LOTS 3, 4, 8, 9 &...
20	SECOND FLOOR DETAIL PLAN LOTS 1 & 2
21	SECOND FLOOR DETAIL PLAN LOTS 3, 4, 8, ...
22	THIRD FLOOR DETAIL PLAN LOTS 1 & 2
23	THIRD FLOOR DETAIL PLAN LOTS 3, 4, 8, 9 &...
24	FOURTH FLOOR DETAIL PLAN LOTS 1 & 2
25	FOURTH FLOOR DETAIL PLAN LOTS 3, 4, 8, ...
26	FIFTH FLOOR DETAIL PLAN LOTS 1 & 2
27	FIFTH FLOOR DETAIL PLAN LOTS 3, 4, 8, 9 & 10
28	ROOF DETAIL PLAN LOTS LOTS 1 & 2
29	ROOF DETAIL PLAN LOTS 3, 4, 8, 9 & 10
30	SITE SECTIONS LOTS 1 & 2
31	SITE SECTIONS LOTS 1 & 2
32	SITE SECTIONS LOTS 3, 4, 8, 9 & 10
33	SITE SECTIONS LOTS 3, 4, 8, 9 & 10
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35	STREETSCAPE ELEVATIONS LOTS 1 & 2
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92	BIN STORAGE AREAS
93	BIN STORAGE AREAS

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Consultant Advice Notice

From	Sophie Hutchinson	**Advice No.**	CAN No-ESD-03
Project	East Brunswick Village	**Project No.**	MEL1849
Date	16 July 2020	**Pages**	1/3
Subject	EBV – Lot 3 and Lot 4	**Revision:**	01

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East Brunswick Village – Stage 3 Section 72 Amendments

This Consultant Advice Notice (CAN) has been prepared alongside the updated ADP Sustainability Management Plan, Rev07, reflecting the proposed changes to East Brunswick Village (EBV) – Stage 3, as part of a Section 72 Application. The proposed changes include the following:

- Addition of a gymnasium on Level 1 to Lot 3 (replacing apartment units)
- Addition of a cinema on Ground Level to Lot 4 (replacing retail spaces)
- The reconfiguration of apartment layouts across both Lots

An improved environmental performance has been observed due to the redesign, including:

- Lot 3 NatHERS average improved from 7.5 Star average to 7.7 Star
- Lot 4 NatHERS average improved from 6.5 Star to 7.9 Star
- The redesign of apartments to generally receive more daylight/ ventilation (in accordance with the required separation distances – for example a 9m separation between Lot 4 Unit 1.18 & Lot 9 Unit 1.10)
- Improved daylight in Lot 4 apartments access due to the addition of light courts
- The previously approved Ground Floor apartments changed to common area / retail, obtaining a better outcome for daylight as these Ground Floor apartments would have received lower Daylight Factors.

These amendments are limited to **within the building fabric of Lots 3 and 4 only** – no update has been therefore been made to any site-wide assessment, such as the Water Sensitive urban Design approach, which has previously been signed off by Moreland City Council in accordance with MPS/2013/979/C, Dated 17/10/2019).

Changes to the SMP

The updated SMP report (Rev09) has made the following updates in line with the design changes:

Lot 3

- Remodelling of Lot 3 apartments, in line with apartment layout changes
- Section J building fabric calculations to the non-residential portions of Lot 3

Lot 4

- Remodelling of Lot 4 apartments, in line with apartment layout changes
- Section J building fabric calculations to the non-residential portions of Lot 4

Key Outcomes of the assessment

Lot 3 - NatHERS Results

- The previous target for Lot 3 apartments was a 7.5 Star average House Energy Rating (NatHERS), with a minimum of 5 Stars.
- Due to the efficient design of the floor plates plus shading provided by balconies, the latest average Star rating for Lot 3 is **7.7 Star,** with a minimum 6.3 star, representing an excellent energy outcome for the Lot – as demonstrated in Table 1:

	U= 2.86 SHGC = 0.53		
Apartment	**Heating Load**	**Cooling Load**	**Star Rating**
2.01D	36.4	24.6	7.8
2.04D	17.7	17.8	8.6
2.06D	21.5	18.8	8.4
2.14D	31.2	10.9	8.4
2.15D	42.1	22.8	7.6
3.04D	22.7	11.8	8.7
3.06D	44.8	19.2	7.6
3.08D	62.8	30.0	6.7
3.09D	49.9	21.4	7.4
3.11D	25.5	14.1	8.4
3.04D	22.7	11.8	8.7

4.06D	45.6	26.2	7.4
4.08D	79.2	25.1	6.3
4.09D	47.5	30.0	7.2
4.11D	37.2	15.8	8.0
Average	**42.6**	**19.9**	**7.7**
Minimum	**22.7**	**10.9**	**6.3**
Maximum	**79.2**	**30.0**	**8.7**

Lot 4 – NatHERS Results

> The previous target for Lot 4 apartments was a 6.5 Star average House Energy Rating (NatHERS), with a minimum of 5 Stars.

> Due to the efficient design of the floor plates plus shading provided by balconies, the latest average Star rating for Lot 4 is **7.9 Star,** with a minimum 6.8 star, representing an excellent energy outcome for the Lot – as demonstrated in Table 2:

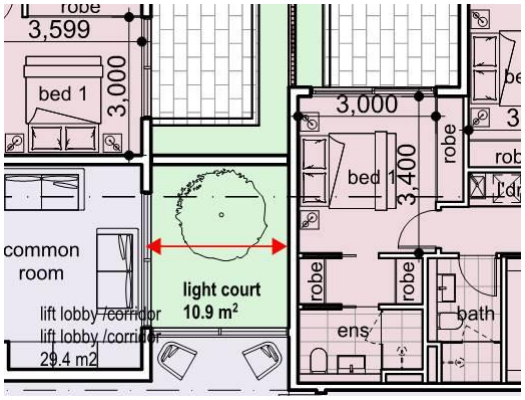
U= 2.86 SHGC = 0.53			
Apartment	**Heating Load**	**Cooling Load**	**Star Rating**
1.01E	39.4	28.5	7.5
1.13E	16.9	15.3	8.7
1.17F	49.1	19.0	7.4
1.23F	29.6	18.6	8.2
1.25F	27.7	15.5	8.4
3.01E	32.8	24.1	7.9
3.13E	32.4	26.0	7.8
3.14E	22.0	16.7	8.5
3.18F	43.0	18.1	7.7
3.24F	23.3	18.0	8.4
3.30F	44.2	24.2	7.4
5.01E	47.8	25.4	7.3
5.07E	43.7	22.0	7.6
5.14E	30.9	17.5	8.2
5.24F	32.2	18.4	8.1
5.25F	37.6	25.2	7.7
Average	**34.5**	**20.8**	**7.9**
Minimum	**16.9**	**15.3**	**7.3**

Maximum	**49.1**	**28.5**	**8.7**

Improved Indoor Environmental Quality outcomes

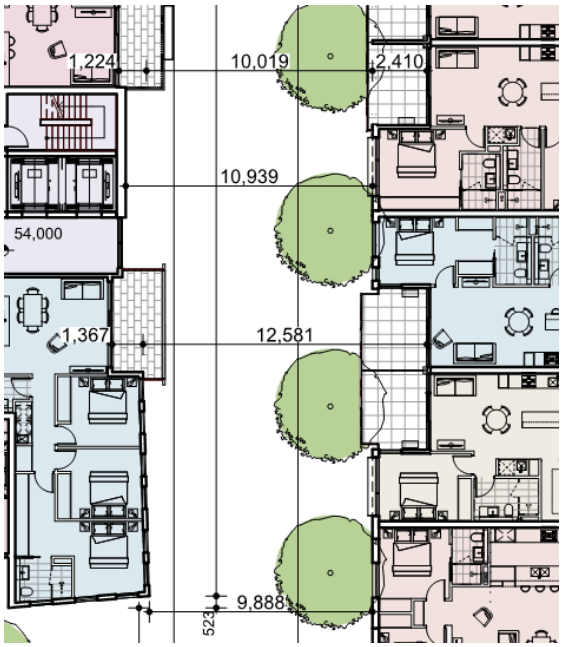
The amendments to Lot 3 and Lot 4 provide an improved Indoor Environmental Quality outcomes – as seen with higher NatHERS ratings for energy efficiency and thermal comfort outcomes, and also through the provision of enhanced daylight levels through the inclusion of light courts.

Figure 1 Addition of Light Courts to Lot 4



The apartments have been designed to meet the required separation distances, as shown in Figure 2:

Figure 2 Minimum separation distances between Lots



Sophie Hutchinson
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Consulting : Engineering

Mixed Use Development

Sustainability Management Plan

East Brunswick Village – Stage 3
127-139 & 149 Nicholson Street
East Brunswick VIC 3057

Revision: 09
Job No: MEL1849
Date: 16 July 2020

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Technical Review	SH	SH	SH	SH	
Signature					
QA and Authorisation	SH	SH	SH	SH	
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1. Introduction

This report provides an overview of the sustainability strategy for the proposed East Brunswick Village Stage 3 development. The project is located at 127-139 & 149 Nicholson Street, East Brunswick, within the municipal boundaries of Moreland City Council. It is a mixed-use development consisting of retail/commercial space and residential apartments, with car parking on basement levels.

This report is based on:

- Revision S(7) drawings, whereby Stage 3 of the development consists of Lot 3, Lot 4, Lot 8, Lot 9 and Lot 10.
- Preliminary TP drawings dated 19/06/2020, whereby Stage 3 of the development consists of Lot 3, Lot 4, Lot 8, Lot 9 and Lot 10.

Revision S7 drawings comprise of the following:

- Lot 3 – retail on ground level, gym and medical centre on level 1, plus residential apartments from level 1 to level 4
- Lot 4 – Cinema and retail/ shop on ground level and residential apartments from level 1 to level 5.
- Lot 8 – office space from ground to level 4 with rooftop amenities
- Lot 9 – residential apartments from ground to level 4
- Lot 10 - residential apartments from ground to level 5

The objective of the report is to indicate how best practice environmentally sustainable design (ESD) is to be incorporated in the development. The report will highlight the ESD objectives for the development and the initiatives proposed to meet these objectives.

1.1 COMMENTARY ON SMP REV 09

Rev09 of the SMP covers the amendments of NatHERS result for lot 3 and Lot 4, and should be read alongside the Consultant Advice Notice- Rev 03 'EBV – Amendments to Lot 3 and 4', which details the improvement on Star rating.

Also, the BESS and Green star matrix have been updated. Refer to Appendix A and B.

1.2 STATUTORY CONTEXT

Moreland City Council adopts Sustainable Design Assessment in the Planning Process (SDAPP) as the preferred means of assessing ESD. The purpose of the SDAPP program is to:

- Make sure that new buildings meet appropriate environmental performance standards.
- Give a clear outline of the environmental objectives and standards required by council
- Provide a consistent, fair approach to assessing planning applications on their environmental impact.
- Offer flexibility on how developments meet these standards with easy-to-use assessment tools.
- Promote awareness and knowledge of the benefits of incorporating sustainability within developments from the planning stage.

In meeting planning requirements, a SMP prepared by a suitably qualified professional must be submitted, addressing the 10 key sustainable building categories:

- Indoor environment quality
- Energy efficiency

- Water efficiency
- Stormwater management
- Building materials
- Transport
- Waste management
- Urban ecology
- Innovation
- Construction and building management

The BESS Tool has been utilised to benchmark the environmental performance of the project. The BESS Tool has been developed to replace the Sustainable Tools for Environmental Performance Strategy (STEPS) assessment tool, whilst still supporting the Council's SDAPP requirements.

In addition to BESS, Green Star (Design & As Built) is also utilised to benchmark the environmental performance of the project.

1.3 SUMMARY OF KEY INITIATIVES

Category	ESD Initiative
Benchmark Tool	• Green Star - Design & As Built self-assessed rating of at least 45 points-4 Star (Score of 52 for non -residential and 54 for residential achieved) • BESS score of 55 (Score of 57 achieved)
Indoor Environment Quality	• Good natural ventilation and daylighting • Access to external views • Use of low toxicity materials: paints, adhesives, sealants, carpets and engineered wood products • Zero ODP refrigerants
Energy Efficiency	• High levels of insulation in the building fabric • Minimum 7.5 star average house energy rating (NatHERS), with a minimum of 5 stars, for Lot 3 apartments (7.7 Star Average achieved) • Minimum 7.5 star average house energy rating (NatHERS), with a minimum of 5 stars, for Lot 4 apartments (7.9 Star Average achieved) • Minimum 6.5 star average house energy rating (NatHERS), with a minimum of 5 stars for Lot 9 and 10 apartments. • Non-residential portions of the development achieving 15% improvement over minimum NCC standards • Efficient, centralised gas hot water system • Efficient air-conditioning systems within one and a half star of best available energy rating • Average lighting power density to be at least 20% less than BCA requirements • High efficiency LED and compact fluorescent lighting with intelligent sensors • Occupancy sensors on common area and car park lighting and daylight sensors on external lighting • Car park ventilation controlled by CO sensors • 15 kW photovoltaic system installed on the roof of each building • Extensive smart metering of energy and water
Water Resources	• Water efficient WELS rated fixtures and fittings • Drought tolerant and native plants for landscaping
Building Materials	• Sustainable material selection relating to PVC, steel, timber

	• Use of low toxicity materials: paints, adhesives, sealants, carpets and engineered wood products • Zero ODP refrigerants
Stormwater Management	• See Appendix D for detail
Transport	• Good access to public transport • Car parking compliant with Council requirements • Provision of bike racks in excess of Green Star requirements • Provision of Green Travel Plan for the development • High level of neighbourhood amenity within walking distance • Flexi car pods located close to development • Charging stations for electric vehicles
Waste Management	• Recycling facilities provided alongside general waste facilities
Urban Ecology	• Site selection does not contribute to urban sprawl • No impact to topsoil • Landscaped roofs common area providing amenity areas and ensuring high Solar Reflectance Index construction to reduce solar gain
Ongoing Building and Site Management	• Comprehensive building commissioning • Building users' guide (BUG) to assist occupants in correct, optimum building operation • Construction waste management plan and 80% reduction in waste to landfill during construction

The project uses BESS, Green Star and STORM assessment tools. Refer to Appendix A for details of the Green Star assessment, Appendix B for details of BESS assessment, and section 1.7 for the STORM rating.

ESD Objectives and Environmental Initiatives

The following section provides details of the ESD initiatives for the project, in line with the project brief.

1.4 INDOOR ENVIRONMENT QUALITY

1.4.1 Natural Ventilation

Buildings with effective natural ventilation provide passive means of cooling and air movement, which encourages occupants to open the windows in preference to using air conditioning. Natural ventilation also improves indoor environment quality by circulating fresh air.

This development supports the use of natural ventilation by providing large sliding doors to balconies and courtyards, as well as openable windows to other areas. Natural ventilation for air movement can be expected to occur under the following conditions[1]:

- Single sided, single opening: 1.5 x ceiling height
- Single sided, multiple openings: 2.5 x ceiling height
- Cross-ventilation: 5 x ceiling height

Following these guidelines, and based on a ceiling height of 2.7 metres, the following ventilation paths are possible:

- Single sided, single opening: 4.05 m
- Single sided, multiple openings: 6.75 m
- Cross-ventilation: 14 m

These natural ventilation paths for sample apartments are shown in Figure 1.

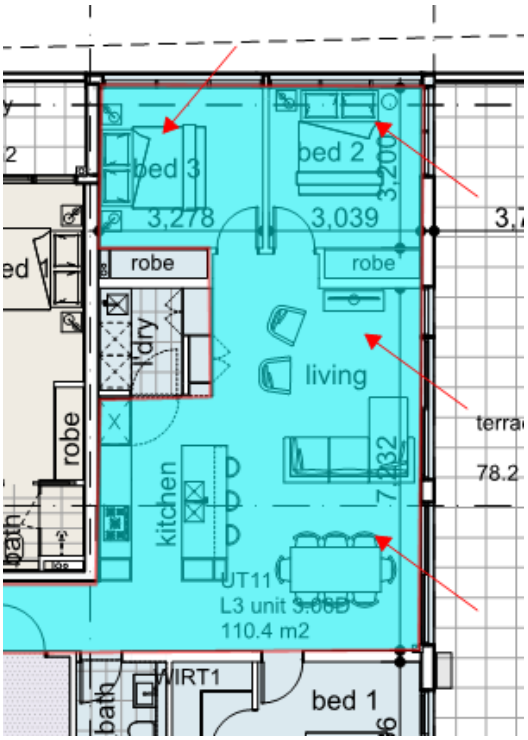


Figure 1: Natural Ventilation Illustrated – Sample Apartment (Blue Highlight)

[1] Royal Institute of British Architects (n.d.) Sustainability Hub.

The natural ventilation will be supplemented by the exhaust fans to kitchens and bathrooms/toilets. As well as removing indoor air pollutants and excess moisture, the exhaust fans will provide an additional air path for fresh air passing through the open façade and will help avoid mould growth.

Window openable areas will be provided in compliance with *AS1668.4: natural ventilation of buildings*. Opening areas must be at least 5% of the area of the room they are serving in order to provide sufficient fresh air for health.

1.4.2 Natural Lighting

Daylighting is important to indoor environment quality and can reduce energy used by artificial lighting. Daylight penetration is generally governed by window to wall ratio (WWR), window head height (WHH) and the presence of any external obstructions. Room layout and artificial lighting design should also take daylight into account in order to realise the greatest energy savings.

In general, the following provide guidance on the depth and quality of daylight[2]:

- Daylit depth of WHH x 1.5 (diffuse only) to WHH x 2.5 (diffuse and direct)
- Daylight feasibility test: WWR > 22% for unobstructed facades or obstruction angle of > 20° when WWR = 100%

The development provides a WHH of approximately 2.7 m, resulting in a daylit depth of 4.05m to 6.75 m from the façade. With large windows to the living and bedrooms, and no windows significantly overshadowed by other buildings, the daylight feasibility test is achieved for 100%. All internal spaces have windows to the outside.

Figure 2 provides visual representations of daylight depth.

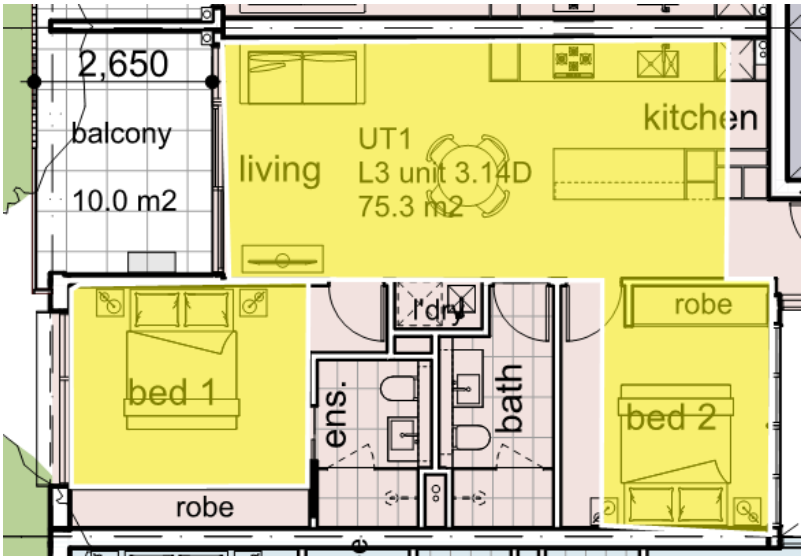


Figure 2: Daylit Depth Illustrated – Sample Apartment (Yellow Highlight)

Daylight will be maximised to apartments through:

- Carefully placed and sized windows to provide daylight to living areas and bedrooms.
- Light coloured glazing to maximise daylight penetration.

[2] Christoph Reinhart (2014). Daylighting Handbook I.

- Spacing of individual lots designed to reduce overshadowing impacts.
- No borrowed light to bedrooms – each bedroom and living space has a window.

A study has been undertaken to compare the daylight performance of previously endorsed plans (Aug 2015) and the current set of drawings.

Based on the plans, it is believed that the current set of plans offers equivalent daylight provision compared to the previously endorsed plans. Refer to Appendix D for further details.

Where possible, the architect has allowed for good practice design intent regarding daylight access. A key goal is to deliver a balanced design outcome that addresses daylight provision as well as a multitude of other driving forces/requirements. For instance, additional shading and smaller windows may limit daylight performance, but will provide enhanced energy efficiency, glare control and reduce overlooking issues.

1.4.3 External Views

All apartments will have external views. In most cases, the line of site will be to beyond the site boundary.

1.4.4 Glare Control

All apartments will have blinds fitted for glare control.

1.4.5 Private External Space

Balconies/terraces are provided to all apartments in the development.

1.4.6 Artificial Lighting Levels

Appropriate levels of lighting (minimum 300 Lux) will be provided at all task-specific locations, as follows:

- Kitchen sink
- Stove/cooktop
- Vanity basins

1.4.7 Individual Control

Individual control allows occupants to adjust their thermal and lighting environment according to comfort preferences, which can vary substantially from person to person. A further advantage of individual control is that it encourages occupants to understand and take responsibility for their own environment and adjust it in response to external ambient conditions.

Individual control will be provided in this development through operable doors, operable windows, and individual control of heating, cooling and lighting within each dwelling.

1.4.8 Mechanical Ventilation

Fresh air ventilation will be improved through the inclusion of exhaust fans to kitchens and bathrooms. As well as removing indoor air pollutants and excess moisture, the exhaust fans will provide an additional air path for air passing through the open façade.

A mechanical exhaust ventilation system will be provided for the basement car park. The car park exhaust fan is to be variable speed controlled based on carbon monoxide levels. The ventilation system will be designed in accordance with AS 1668.2-2012.

1.4.9 Internal Noise Levels

Incursion of environmental noise, particularly traffic noise, will be limited through the use of glazing which will be specified to meet acoustic performance criteria in line with Australian Standards.

The project will aim to achieve internal noise levels in the dwellings that are no more than 5 dB(A) above the satisfactory sound levels provided in AS2107, and the partition between the spaces to be constructed to achieve a weighted sound reduction index (Rw) of at least 45.

1.4.10 Volatile Organic Compounds

Materials containing Volatile Organic Compounds (VOCs) emit fumes at room temperatures and have been linked to a variety of health problems including respiratory disorders and eye, nose and throat irritation.

They are commonly found in products such as paints, sealants, adhesives, and wall and ceiling coverings. When selecting these items, Table 1 through Table 4 will be followed.

Table 1: Total VOC limits for Paints and Varnishes

Product Type	Max TVOC Content (g/l of ready-to-use product)
Walls and ceilings – interior gloss	75
Walls and ceilings – interior semi-gloss	16
Walls and ceilings – interior low sheen	16
Walls and ceilings – interior flat washable	16
Ceilings – interior flat	14
Trim – gloss, semi-gloss, satin, varnishes and woodstains	75
Timber and binding primers	30
Latex primer for galvanized iron and zincalume	60
Interior latex undercoat	65
Interior sealer	65
One and two pack performance coatings for floors	140
Any solvent-based coatings whose purpose is not covered in table	200

Table 2: Max TVOC Content Limits for Adhesives and Sealants

Product Type	Max TVOC Content (g/l of product)
Indoor carpet adhesive	50
Carpet pad adhesive	50
Wood flooring and Laminate adhesive	100
Rubber flooring adhesive	60
Sub-floor adhesive	50
Ceramic tile adhesive	65
Cove base adhesive	50
Dry Wall and Panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Architectural sealants	250

Table 3: Flooring TVOC Emissions Limits

Coverings other than carpets	Max TVOC Emission Limit (mg/m^2 per hour)
Carpets and other flooring products (using ASTM D5116):	
Total VOC limit	0.5 mg/m^2 per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m^2 per hour
Flooring products other than carpet (using ISO 16000 test protocol):	

TVOC at 3 days	5
TVOC at 28 days	0.5

Table 4: Wall and Ceiling Covering TVOC Emissions Limits

Coverings other than carpets	Max TVOC Emission Limit (mg/m^2 per hour)
TVOC at 3 days	5
TVOC at 28 days	0.5

1.4.11 Formaldehyde Minimisation

Low-formaldehyde composite wood products will be specified throughout, complying with E1, E0, Super E0 or lower emission limits. This requirement applies to any of the following when installed internally:

- Particleboard
- Plywood
- Veneer
- MDF
- Decorative overlaid wood panels

1.5 ENERGY EFFICIENCY

1.5.1 Passive Design

The layout of the buildings within the development allows apartments to access the benefits of passive solar heating, daylight and ventilation.

- Individual buildings are positioned to allow daylight and ventilation access to all areas.
- Building shape aims to maximize solar gains during winter.
- Spacing of towers and courtyards enhances daylight penetration.
- External shading features reduce summer heat gains through windows.
- Modulated building heights throughout the development reduces overshadowing effects.
- Street layout specifically designed to minimise solar and wind shadowing.
- Limited setback improves overshadowing effects along neighbouring properties from current conditions.

1.5.2 House Energy Rating - Residential

NCC2016-BCA Section J0.2a states that the sole-occupancy units of a Class 2 building or a Class 4 part of a building must:

> *(a) for reducing the heating or cooling loads -*
> *(i) collectively achieve an average energy rating of not less than 6 stars; and*
> *(ii) individually achieve an energy rating of not less than 5 stars, using house energy rating software*

The project is committed to achieving the following:

- Minimum 7.5 star average house energy rating (NatHERS), with a minimum of 5 stars, for Lot 3 apartments (7.7 Star Average achieved).
- Minimum 7.5 star average house energy rating (NatHERS), with a minimum of 5 stars, for Lot 4 apartments (7.9 Star Average achieved).
- 6.5 star average house energy rating (NatHERS), with a minimum of 5 stars, for Lot 8, 9 and 10 apartments.

Prelim First Rate results are provided below, for Lot 3:

U= 2.86 SHGC = 0.53			
Apartment	**Heating Load**	**Cooling Load**	**Star Rating**
2.01D	36.4	24.6	7.8
2.04D	17.7	17.8	8.6
2.06D	21.5	18.8	8.4
2.14D	31.2	10.9	8.4
2.15D	42.1	22.8	7.6
3.04D	22.7	11.8	8.7
3.06D	44.8	19.2	7.6
3.08D	62.8	30	6.7
3.09D	49.9	21.4	7.4
3.11D	25.5	14.1	8.4
3.04D	22.7	11.8	8.7
4.06D	45.6	26.2	7.4
4.08D	79.2	25.1	6.3
4.09D	47.5	30	7.2
4.11D	37.2	15.8	8
Average	**42.6**	**19.9**	**7.7**
Minimum	**22.7**	**10.9**	**6.3**
Maximum	**79.2**	**30.0**	**8.7**

Prelim First Rate results are provided below, for Lot 4:

U= 2.86 SHGC = 0.53			
Apartment	**Heating Load**	**Cooling Load**	**Star Rating**
1.01E	39.4	28.5	7.5
1.13E	16.9	15.3	8.7
1.17F	49.1	19	7.4
1.23F	29.6	18.6	8.2
1.25F	27.7	15.5	8.4
3.01E	32.8	24.1	7.9
3.13E	32.4	26	7.8
3.14E	22	16.7	8.5
3.18F	43	18.1	7.7
3.24F	23.3	18	8.4
3.30F	44.2	24.2	7.4
5.01E	47.8	25.4	7.3
5.07E	43.7	22	7.6
5.14E	30.9	17.5	8.2
5.24F	32.2	18.4	8.1
5.25F	37.6	25.2	7.7
Average	**34.5**	**20.8**	**7.9**
Minimum	**16.9**	**15.3**	**7.3**
Maximum	**49.1**	**28.5**	**8.7**

1.5.3 BCA Section J Compliance - Non Residential

The non-residential areas will exceed the Clause 22.08 of the Moreland Planning scheme by achieving 15% improvement on NCC Section J energy efficiency requirements. JV3 modelling for non-residential areas will be undertaken to demonstrate this.

This level of performance exceeds Green Star Design & As Built Energy Efficiency Conditional Requirement, which states that the Proposed Building is to achieve at least 10% improvement over minimum NCC compliance Reference Building.

1.5.4 Insulation – Non Residential

The building has been designed to incorporate bulk insulation within the floor, roof and walls to minimise the heat loss in winter and heat gain in summer. The proposed preliminary insulation levels are as follows:

- Roof: R3.2
- External walls: R2.8
- Internal walls to unconditioned spaces (stairs, risers, shafts): R1.8
- Floor/slab above unconditioned space: R2.0

Insulation levels will be confirmed after final energy assessment is completed.

1.5.5 Glazing

High-performance glazing will be used to control solar gain from direct sunlight, reduce noise levels and minimise heat gain, heat loss, and radiant discomfort. Glazing shall be of low-e single- or double-glazed type,

or equivalent, with specifications finalised during the detailed design phase when energy assessment is completed, and acoustic performance established.

1.5.6 Thermal Mass

The thermal mass effect is the ability of materials to store and release energy over time. Thermal mass can lower indoor temperatures during the day and raise night-time temperatures, utilising direct sunlight and diurnal temperature and ventilation patterns.

The thermally massive concrete structure of the development will help maintain comfortable conditions and reduce energy use by stabilising indoor temperatures. This complements the insulation and glazing, which protect internal spaces from external weather extremes.

1.5.7 Heating / Air-Conditioning Systems

The requirements for heating and air-conditioning have been minimised through passive design including glazing orientation and natural ventilation, however active systems will still be required to provide a suitable level of comfort.

The development will be generally heated and cooled via high efficiency air-conditioning systems. All systems will aim to have energy ratings within one and a half energy star of the best available on the market for the applicable system size, with a minimum of at least 3 stars.

The rated capacity of the air conditioning equipment will not exceed the design heating capacity by more than 20% and the design cooling capacity by more than 10%.

All air-conditioning systems will use zero ozone depletion potential (ODP) refrigerant.

1.5.8 Domestic Hot Water Systems

The building will incorporate a centralised gas hot water system. High efficiency five-star gas water heaters will be selected to minimise gas consumption.

Water distribution pipework will be designed to minimise hot water system piping length, piping diameter and maximise hot water piping insulation in accordance to the BCA to minimise heat loss.

A centralised gas hot water system has the following benefits:

- Low greenhouse gas emissions per unit of hot water generated
- High efficiency and lower storage heat losses due to centralised system
- Year-round performance

The domestic hot water energy usage will be offset via PV panels. Details are found in section 1.5.15.

1.5.9 Artificial Lighting

Poorly designed or controlled lighting systems can use a significant amount of energy. By selecting efficient light fittings, significant energy savings can be achieved.

The development will utilise efficient lighting fittings, with a combination of LED and compact fluorescent lighting to be used according to the requirements for each area. Additionally, lamps will be spaced economically to avoid over-lighting. No incandescent or dichroic (halogen downlight) lighting will be used in this development.

The maximum illumination power density (W/m2) will be at least 20% lower than required by Table J6.2a of the NCC BCA (2013) Volume 1 Section J.

1.5.10 Lighting Control Systems

Whilst efficient artificial lighting systems will be used throughout the project, the greatest energy and greenhouse gas savings can be made by implementing a control system that switches off the artificial lighting when not in use. The following control strategies are implemented:

- Light switches on entry to the apartments
- Car park lighting to be controlled via occupancy sensors
- Lobbies, corridors and common areas to be controlled via motion sensor controls and/or time clocks
- External lighting to be controlled by daylight sensors, and/or time clocks.
- 24-hour lighting to be provided by exit signs where possible, eliminating the need for additional 24-hour lights

1.5.11 Car Park Ventilation

Car park ventilation systems will be controlled to ensure fans are not running needlessly, using carbon monoxide sensors and variable speed drives. The car park ventilation system will be designed to reduce fan size, and hence energy consumption, as much as possible.

1.5.12 Gas Cooking Systems

The development will aim to use gas cooking appliances only, which help to reduce the overall greenhouse gas emissions and peak electrical load associated with the development.

1.5.13 Appliances

All appliances, if installed as part of the base building package, will have energy rating **within one star of best rating available** for that appliance type and capacity. Potential appliances that are subject to the energy star rating requirement include:

- Refrigerators/freezers
- Dishwashers
- Washing machines

1.5.14 Peak Demand Reduction

Several energy efficiency measures have the additional effect of reducing peak electricity demand. This reduced pressure on electricity networks, particularly during times of peak cooling and heating use. The following initiatives will reduce electrical demand:

- Centralised gas hot water system
- High performance facade, which reduce the peak heating and cooling requirements
- High efficiency air conditioning system
- Energy efficient appliances, lighting, and central systems
- Use of non-electric cooking appliances

1.5.15 Renewable Energy

The development will include renewable energy in the form of a photovoltaic array producing electricity.

A 15 kWp photovoltaic system is proposed for each building. The carbon emissions offset by the solar photovoltaic system are shown in Table 5.

The solar photovoltaic system will be situated on the roof, ensuring uninterrupted solar access. The electricity generated will offset the base building power usage, and the system will be managed by the embedded network provider.

Table 5: Carbon Abatement Options – Stage 1

System Type	Energy	Carbon Factor	Carbon Emissions
Photovoltaic system 15 kWp (**Lot 3**)	19,710 kWh/annum	1.32 $kgCO_2$-e/kWh	26,017 $kgCO_2$-e/annum
Photovoltaic system 15 kWp (**Lot 4**)	19,710 kWh/annum	1.32 $kgCO_2$-e/kWh	26,017 $kgCO_2$-e/annum
Photovoltaic system 15 kWp (**Lot 8**)	19,710 kWh/annum	1.32 $kgCO_2$-e/kWh	26,017 $kgCO_2$-e/annum
Photovoltaic system 15 kWp (**Lot 9**)	19,710 kWh/annum	1.32 $kgCO_2$-e/kWh	26,017 $kgCO_2$-e/annum
Photovoltaic system 15 kWp (**Lot 10**)	19,710 kWh/annum	1.32 $kgCO_2$-e/kWh	26,017 $kgCO_2$-e/annum
Photovoltaic system **Stage 3 Total**	98,550 kWh/annum	1.32 $kgCO_2$-e/kWh	130,085 $kgCO_2$-e/annum

A 15 kWp PV installation is approximately around 60 x 250W panels, each panel measuring roughly 1.1m x 1.7m. Final number of panels and spatial requirements can vary depending on panel type, configurations and clearance requirements.

The Council has requested that the size of the solar photovoltaic systems be justified with respect to the commitments within the ESD masterplan (specifically page 7, Section 3.4).

The Endorsed ESD Environmental Management Plan, prepared by Hamilton Sustainability, dated September 2012, states that, ideally, PV would be sized to provide electricity for half of common area lighting and ventilation needs.

Table 6 provides a summary of the common area lighting and ventilation loads.

The results show that Lot 1 and Lot 2 PV contribution exceed common area lighting and ventilation loads. This easily meets the 50% ideal target nominated in the Endorsed ESD Environmental Management Plan.

Table 6: PV Sizing Rationalization

Lot Number	Lighting Power	Ventilation Power	Lighting & Ventilation Power	PV Capacity	PV Contribution
-	kW	kW	kW	kW	-
Lot 1	4.98	1.28	6.26	15	239%
Lot 2	10.22	2.54	12.76	15	118%
Lot 3	**4.73**	**1.22**	**5.95**	**15**	**252%**
Lot 4	**9.41**	**2.35**	**11.76**	**15**	**128%**
Lot 5	7.60	1.91	9.52	15	158%
Lot 6	3.14	0.83	3.97	15	378%
Lot 7	5.63	1.44	7.07	15	212%
Lot 8	**1.40**	**0.39**	**1.78**	**15**	**842%**
Lot 9	**4.64**	**1.20**	**5.84**	**15**	**257%**
Lot 10	**2.56**	**0.68**	**3.24**	**15**	**463%**
Total	**54.31**	**13.82**	**68.13**	**150**	**220%**

1.6 WATER RESOURCES

1.6.1 Efficient Fixtures

To minimise the water consumed, water efficient fittings, fixtures and appliances will be selected for installation in the development. The following minimum WELS ratings will be used:

- Showers: 3 stars (7.5 L/min or lower)
- Toilets: 4 stars (3/4.5 L/flush or lower)
- Taps: 5 stars (6 L/min or lower)
- Urinals: 5 stars <1 L/stall (with smart demand operation and urine sensing device)
- Dishwashers: 5 stars (if provided as part of base building package)
- Washing machines: 4 stars (if provided as part of base building package)

1.6.2 Rainwater Harvesting

A rainwater collection and reuse system will be in place. Refer to Section 1.7 for full details.

1.6.3 Fire System Test Water

The fire system will include temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. Sprinkler systems will be fitted with isolation valves or shut-off points on each floor for floor-by-floor testing.

1.6.4 Water Metering

Water meters will be provided for all major water uses in the building and individual water meters will be provided for each tenancy / dwelling.

1.6.5 Landscape Irrigation

The landscaping design will give preference to drought tolerant or indigenous species that require very little or no watering once established, and rainwater will be used for irrigation.

1.6.6 Minimise Dead Legs

Water wastage will be reduced through careful design by reducing heated water outlet piping length (dead leg) to reduce water consumption before full temperature water delivery.

1.7 BUILDING MATERIALS

1.7.1 Material Selection

A review process will be implemented to identify opportunities to use more sustainable products and materials, considering broad environmental impact. Where possible, materials used within the development will be selected to minimise environmental impact. The following criteria will be considered:

- Products that reduce raw and non-renewable material use, such as those with recycled content or those which use raw materials more efficiently
- Products with low impact disposal, such as products from manufacturers with end of lifecycle recycling systems
- Low embodied energy and embodied carbon
- Materials that are durable and fit for purpose, and hence can be expected to have a longer serviceable life
- Materials from sustainable sources such as timbers from recognised plantations (e.g. Australian Forestry Standard)
- Materials which are recognised as being manufactured under environmentally responsible systems and accredited by an independent body such as Good Environmental Choice Australia
- Materials that have a high probability of being recycled at end of life due to ease of recycling or high recoverable value
- Materials produced using ethical labour and fair trade
- Locally produced materials and products, due to the lower associated transportation emissions.

1.7.2 Steel

At least 60% of all steel (by mass) used on the project will either have a post-consumer recycled content greater than 50% or is reused.

1.7.3 PVC Reduction

The target for the project is that at least 60% of the common use PVC in the building (by cost) will be replaced with PVC complying with the Best Practice guidelines published by the Green Building Council of Australia (http://www.gbca.org.au/files/literature-review-and-best-practice-guidelines-for-the-life-cycle-of-pvc-products), HDPE, or other alternative product. This requirement applies to the following:

- Pipes, conduits and associated fittings
- Wire and cable insulation
- Vinyl flooring and PVC-backed carpet
- Resilient wall coverings containing PVC

1.7.4 Timber

At least 95% (by cost) of the timber used in the construction of the building will be certified by a recognized forest certification scheme including the Australian Forestry Standard, Forest Stewardship Council, or Programmed for the Endorsement of Forest Certification, or will be reused / post-consumer recycled timber.

1.7.5 Volatile Organic Compounds

Materials containing Volatile Organic Compounds (VOCs) emit fumes at room temperatures and have been linked to a variety of health problems including respiratory disorders and eye, nose and throat irritation.

They are commonly found in products such as paints, sealants, adhesives, and wall and ceiling coverings. When selecting these items, Table 1 through Table 4 will be followed.

Table 7: Total VOC limits for Paints and Varnishes

Product Type	Max TVOC Content (g/l of ready-to-use product)
Walls and ceilings – interior gloss	75
Walls and ceilings – interior semi gloss	16
Walls and ceilings – interior low sheen	16
Walls and ceilings – interior flat washable	16
Ceilings – interior flat	14
Trim – gloss, semi gloss, satin, varnishes and woodstains	75
Timber and binding primers	30
Latex primer for galvanized iron and zincalume	60
Interior latex undercoat	65
Interior sealer	65
One and two pack performance coatings for floors	140
Any solvent-based coatings whose purpose is not covered in table	200

Table 8: Max TVOC Content Limits for Adhesives and Sealants

Product Type	Max TVOC Content (g/l of product)
Indoor carpet adhesive	50
Carpet pad adhesive	50
Wood flooring and Laminate adhesive	100
Rubber flooring adhesive	60
Sub-floor adhesive	50
Ceramic tile adhesive	65
Cove base adhesive	50
Dry Wall and Panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Architectural sealants	250

Table 9: Flooring TVOC Emissions Limits

Coverings other than carpets	Max TVOC Emission Limit (mg/m^2 per hour)
Carpets and other flooring products (using ASTM D5116):	
Total VOC limit	0.5 mg/m^2 per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m^2 per hour
Flooring products other than carpet (using ISO 16000 test protocol):	
TVOC at 3 days	5
TVOC at 28 days	0.5

Table 10: Wall and Ceiling Covering TVOC Emissions Limits

Coverings other than carpets	Max TVOC Emission Limit (mg/m^2 per hour)
TVOC at 3 days	5
TVOC at 28 days	0.5

1.7.6 Paint VOC Content

Over 50% of paint (by cost) to have a TVOC content of <5g/L.

1.7.7 Formaldehyde Minimisation

Low-formaldehyde composite wood products will be specified throughout, complying with E1, E0, Super E0 or lower emission limits. This requirement applies to any of the following when installed internally:

- Particleboard
- Plywood
- Veneer
- MDF
- Decorative overlaid wood panels

1.7.8 Road surfaces

The civil drawings associated with the project detail concrete road construction, with light coloured pavers and walkways.

1.7.9 Reduction of Construction Materials

The development aims to reduce the amount of construction materials required via the following:

- Design to standard dimensions to reduce offcuts and wastage
- Double backed units will limit the amount of shared circulation space and improve efficiency of both the space and the materials and services required
- Where practical and feasible, items such as bathrooms and kitchen will be pre-fabricated offsite.

1.8 STORMWATER MANAGEMENT

The following report provides an analysis of the Water Sensitive Urban Design (WSUD) methodology for Stage 3, consisting of Lot 3, Lot 4, Lot 8, Lot 9 and Lot 10 of the development located at 149 Nicholson Street. WSUD principles seek to achieve integrated water management by:

- Reducing potable water consumption
- Maximising water reuse
- Reducing wastewater discharge
- Minimising stormwater pollution before it is discharged to the aquatic environment
- Maximising groundwater protection.

This report analyses the measures to achieve these outcomes, and how it achieves these principles through the following:

- Providing appropriate potable or alternative supply of water for the end purpose
- Applying best practice to stormwater management through appropriate management facilities including the following:
    - Collection from non-trafficable roof and trafficable terrace of each Lot.
    - Storage in rainwater tanks for re-use for each Lot.
    - The rainwater collected will be reused for toilet flushing and/ or irrigation.

A summary of WSUD measure for Stage 3 is presented in Table 11.

Table 11: WSUD Measures Summary

Area Summary	Lot 3	Lot 4	Lot 8	Lot 9	Lot 10
Site Area	3,081	5,379	1,490	2,067	1,685
Non-Trafficable Roof Area	1,117	1,810	298	1,064	589
Trafficable Terrace/ Balcony	358	1,080	394	0	239
Others (untreated)	1,396	1,712	543	640	492
Landscape Area	210	768	255	363	365
Rainwater Tank Size (L)	75,000	100,000	30,000	40,000	30,000
Toilets / Occupants Served	110	190	60	85	90
STORM Score: 100%					

Please refer to the Appendix D for the full details of the Water Sensitive Urban Design Strategy.

1.8.1 Construction Site Management Plan

A stormwater pollution reduction strategy will be contractually required to be adopted by the Main Contractor as part of its overall Environmental Management Plan (EMP). The strategy should prevent construction debris and littering entering the stormwater systems. The EMP will be required to specifically address the following in respect to stormwater:

1. Objectives
    a. No impact on offsite surface or ground water due to construction activities
    b. Site stormwater to be managed such that no contaminated water is discharged from site
2. General
    a. Materials and waste to be stored at least 2m away from drainage lines
    b. All inadvertent chemical spills to be cleaned up immediately
    c. Application and inclusion of a range of mitigation measures for soil depositing on roads, stormwater, dust and noise
3. Stormwater
    a. Installation of hay bales around stormwater drains to minimise sediment entering stormwater
    b. Installation of crushed rock to frequently used tracks / haul roads that may produce sediment

1.8.2 Maintenance Program

The proposed system will be routinely maintained as part of the maintenance programme and will be included in the service requirements of the project.
The following will be followed:

First flush devices will be cleaned every 6 months

> Roof and other collection areas will be inspected regularly, at a minimum every 3 months to ensure they are maintained free of pollutants

> The type of tanks and pump will be maintained in accordance with manufacturers' requirements – typically annually but quarterly in the first year as part of building tuning phase.

A sample maintenance manual is attached for reference.

1.9 TRANSPORT

By proving both residential and commercial facilities within the same location, the development will reduce residents' need to travel. With a supermarket, general retail, cafes and the opportunity for services such as banks, doctors and dentists, residents will be able to walk to fulfil most of their daily errands.

1.9.1 Public Transport

The site has access to public transport options including:

- Trams 1, 8, 96
- Bus 506

Access to public transport will benefit the development through a reduced reliance on cars as a means of transport. This, in turn, will reduce greenhouse gas emissions associated with occupants of the development.

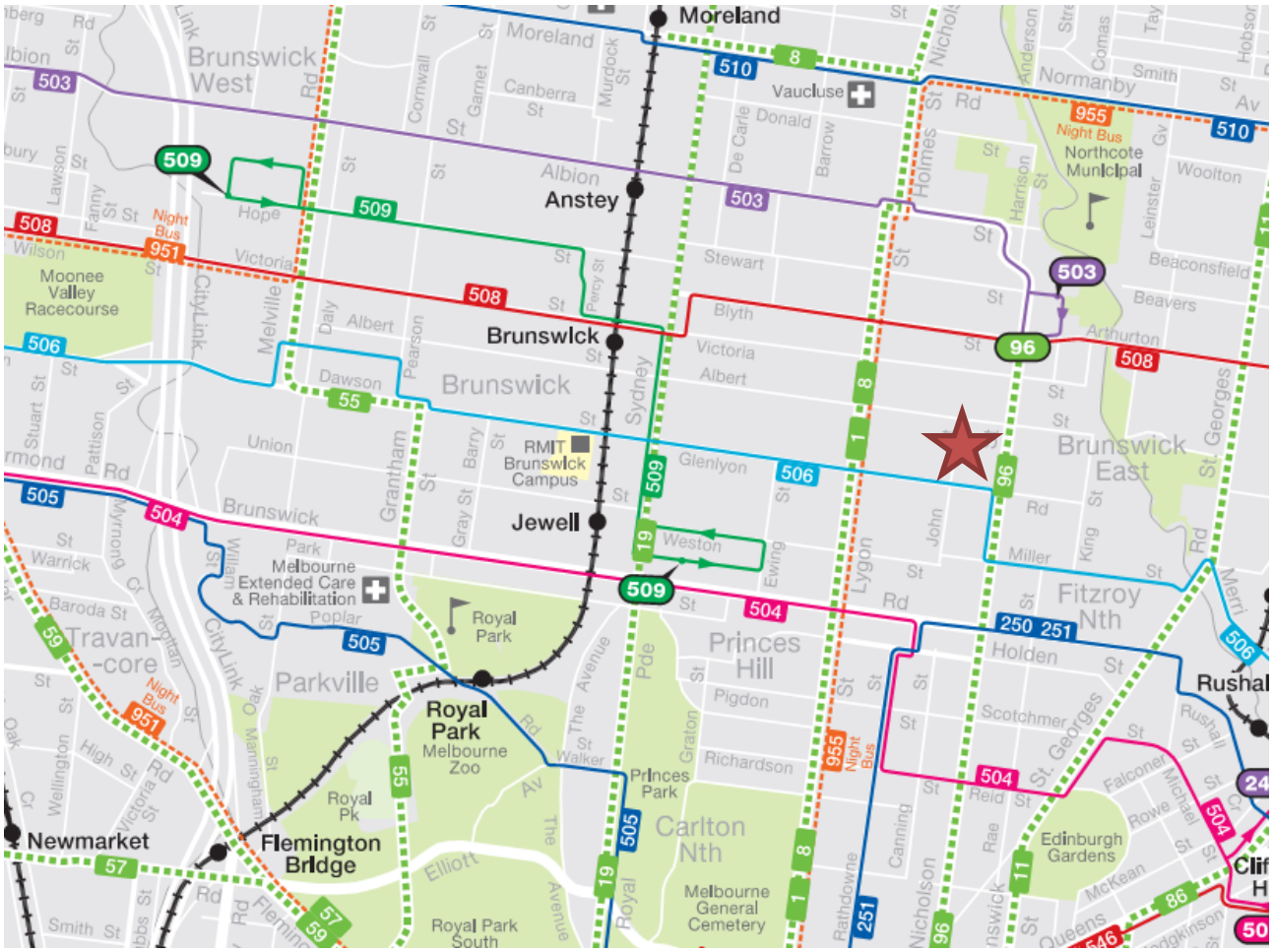


Figure 3: Local Public Transport (ptv.vic.gov.au)

1.9.2 Car Parking

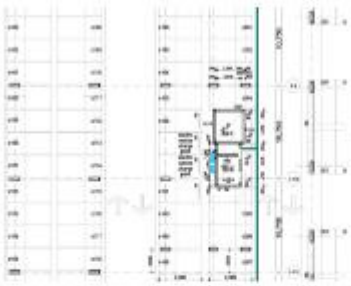
Car parking provision is limited and less than what is prescribed by the applicable parking overlay under the Council's Planning Scheme.

1.9.3 Flexi Pods & Electric Chargers

Two Flexicar pods are located near the development on Blyth St and Glenlyon Rd, with an on-site pod location currently under investigation.
Two vehicle charging spaces each are provided in the Basement 1 retail carpark and in the Basement 2 basement car park that would be accessible to lot 4 residents

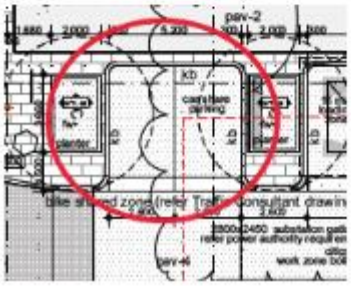
Two additional charging points are provided with wayfinding i.e. single pillar along village way (refer to figure below).

Location 01
Basement 2 Residential



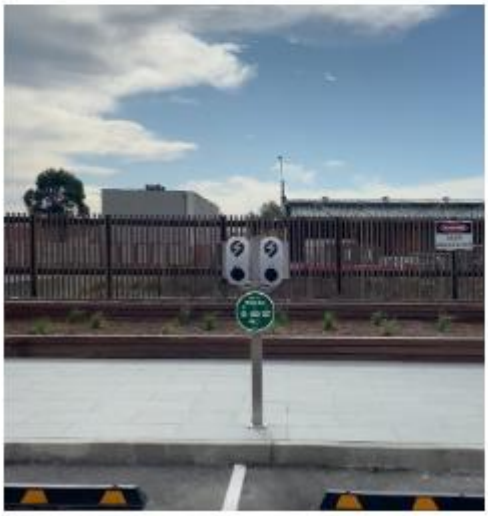
Location 02
Basement 1 Retail

Location 03
Village Way GR Floor



Install next to charge units

Installation options freestanding unit



1.9.4 Bicycle Use

Secure bike parking will be provided at convenient locations around the site.

A total of 967 bike racks will be provided across the site. This exceeds both Green Star and Council guidelines by considerable margins.

The breakdown is as per development schedule attached in Appendix C:

- Residential bike racks = 825
- Visitor bike racks = 99
- Retail visitor bike racks = 30
- Retail staff bike racks = 13

1.9.5 Walkability

Walkscore.com measures the walkability of any address worldwide by assessing proximity to nearby amenities such as schools, groceries, shopping, parks, errands and entertainment. Amenities within a 5-minute walk are given maximum points, decreasing to a maximum walk distance of 30 minutes. The score out of 100 corresponds with a rating (Table 12).

Table 12: Walk Score Rating System

Walk Score	Description
90–100	**Walker's Paradise** Daily errands do not require a car.
70–89	**Very Walkable** Most errands can be accomplished on foot.
50–69	**Somewhat Walkable** Some errands can be accomplished on foot.
25–49	**Car-Dependent** Most errands require a car.
0–24	**Car-Dependent** Almost all errands require a car.

The development achieves a Walkscore of 87, or 'Very Walkable', indicating that most errands can be accomplished on foot, as shown in Figure 4.

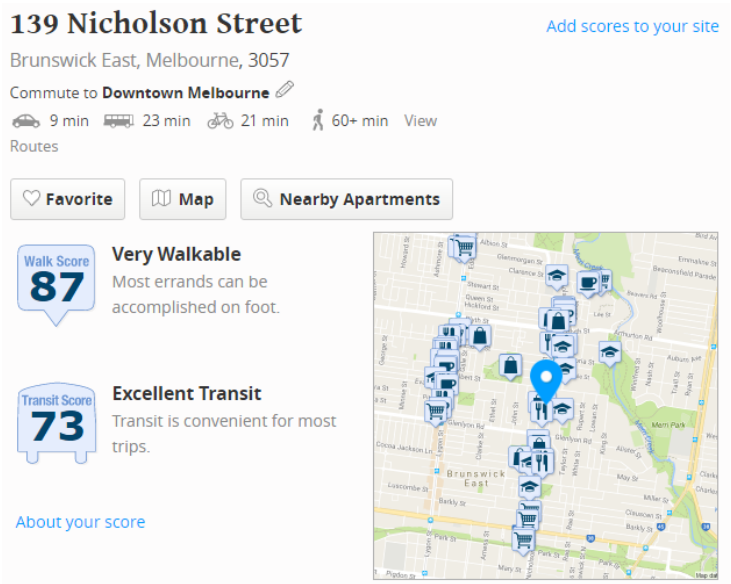


Figure 4: Walkability Score

The development is located on Nicholson St and a short walk from the Lygon St shopping precinct.

Within walking distance, residents can access shops, medical facilities, restaurants, banks, fitness centres, and a host of specialty shops. This will greatly diminish their need to travel by car for basic living necessities.

The development is located between two parks and only 300m from Merri Creek, which provides recreational facilities, walking paths and a bike path that accesses the city.

The Green Star Public Transport Calculator yielded 1 point for the project site.

1.10 WASTE MANAGEMENT

1.10.1 Operational Waste Management

Dedicated, sufficiently sized areas for the storage and collection of the applicable waste streams will be provided. Such dedicated storage areas for the separation, collection and recycling of waste can be easily accessed by building occupants and will have suitable access for recycling contractors.

The storage areas will be sized to accommodate all relevant bins or containers, for all applicable waste streams, for at least one collection cycle. Access requirements for waste collection areas will adhere to best practices.

Guidance on correct waste management practices will be included in the building users' guide.

1.10.2 Construction Waste Management

The builder will implement a comprehensive Construction Waste Management Plan and an Environmental Management Plan. The project will aim to reuse or recycle at least 80% (by mass) of all construction and demolition waste.

Materials from demolition of existing buildings on site will be recycled.

1.10.3 Sewerage

Sewerage emissions will be significantly reduced through the requirement to utilise efficient fixtures and fittings, which will reduce the total volume of water draining to sewer.

1.10.4 Ozone Depleting Substances

All thermal insulation and refrigerants will be free from ozone-depleting substances, both in composition and manufacture.

1.10.5 Occupant Education

The Building Users Guide (BUG, refer section 1.12.2) will include guidance on minimizing pollution, including:

- What may and may not be disposed of down drains
- Environmentally preferable products (e.g. detergents) for minimising pollution
- Correct disposal of potentially harmful items such as batteries

1.11 URBAN ECOLOGY

1.11.1 Reuse of Developed Land

The site is currently occupied by an industrial facility and is completely covered with buildings and hardscape surfaces. Besides contributing significantly to stormwater runoff and pollution, the site currently has limited ecological value and is at odds with the surrounding urban environment and in particular the nearby Merri Creek corridor.

The proposed development will significantly enhance the ecological value of the site by introducing landscaped areas with local indigenous plants, increasing biodiversity and providing habitat for birds, insects and animals. It will also increase overall housing density, which is needed to limit urban sprawl.

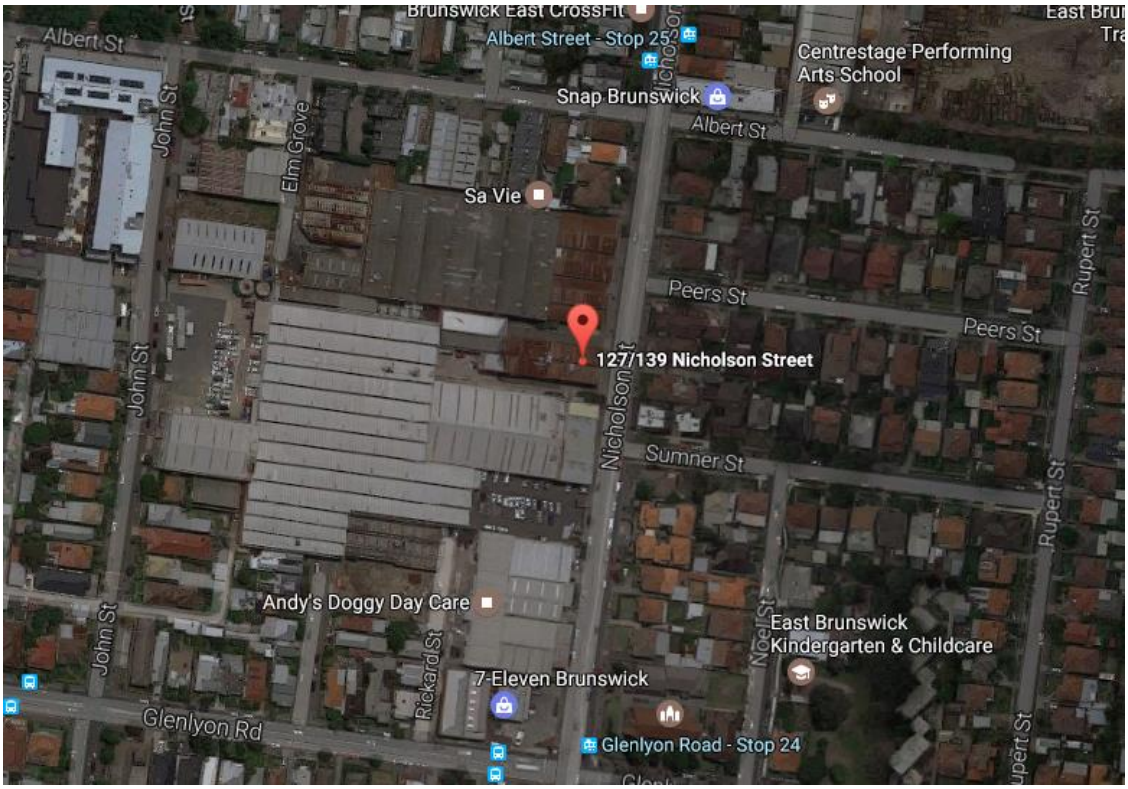


Figure 5: Existing Site

1.11.2 Topsoil

As the site is already developed with buildings and impermeable surfaces, no topsoil will be impacted by the development.

1.11.3 Endangered, Threatened or Vulnerable Species

As the site is already developed, there is no critically endangered, endangered, or vulnerable species, or ecological communities present on the site at time of purchase.

1.11.4 Heat Island Effect

Urban heat island effect is a phenomenon where temperatures in urban areas are warmer than the surrounding rural areas, most obviously during evening and night, due to differences in rate of cooling. This is caused by the layout of urban areas, urban canyons, and thermally massive building materials such as concrete, lack of vegetation, removal of water and generation of heat by vehicles and buildings. In Melbourne, the effect ranges from 2 to 4 °C up to a peak of 7°C.[3]

[3] Coutts, Beringer, Jimi and Tapper (2009). The urban heat island in Melbourne: drivers, spatial and temporal variability, and the vital role of stormwater.

The development includes shale grey roofing materials which have an initial SRI of 66.

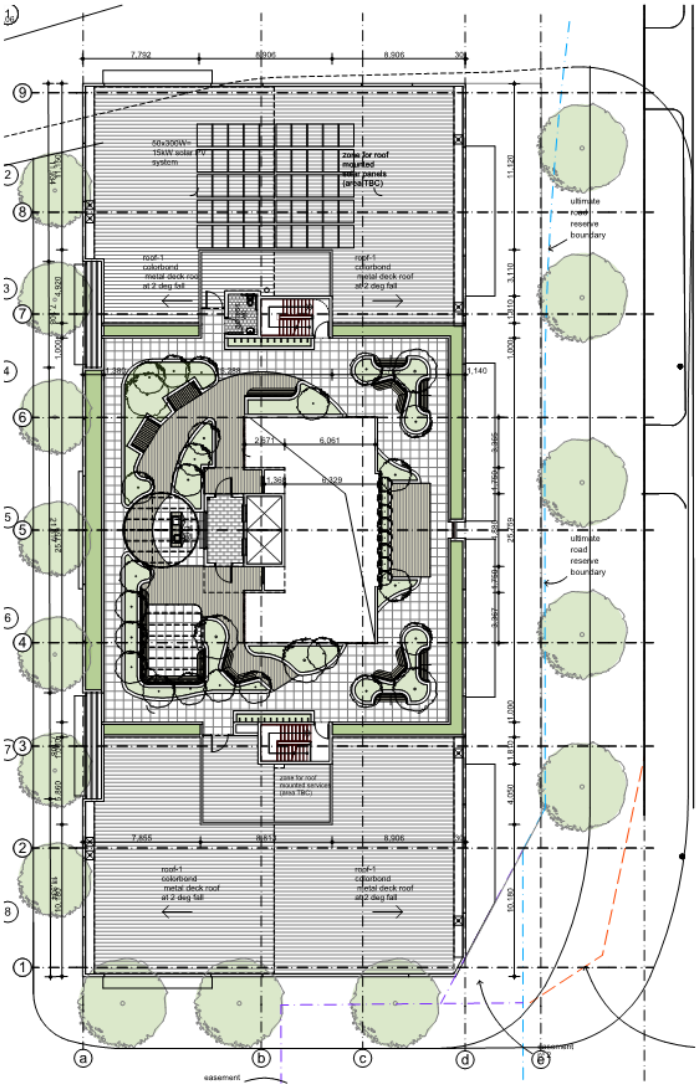


Figure 6: Landscaping to roof

1.11.5 Light Pollution

The project will comply with AS 4282 "Control of the Obtrusive Effects of Outdoor Lighting". Where possible, external lighting will avoid upward lighting in order to reduce light pollution to the sky.

1.11.6 CERES

The development is located close to CERES, the community environment park. Residents can access locally grown, sustainable organic food produce and nursery plants at CERES, and learn about sustainable building, farming and living practices.

This proximity has the potential to significantly improve the ecological footprint for residents through the reduction of food miles and access to cleaner and healthier food grown locally. Residents also have the opportunity to either hire a community garden plot to grow their own food, or volunteer at the site to contribute to local food production.

1.12 ONGOING BUILDING AND SITE MANAGEMENT

1.12.1 Commissioning of Building Systems

The importance of commissioning building service systems is crucial in achieving the intended environmental benefits. Commissioning has historically been carried out to low standards in the Australian commercial property sector. During design and construction, the project team will ensure that:

- Comprehensive pre-commissioning, commissioning, and quality monitoring are performed for all building services (BMS, mechanical, electrical and hydraulic).
- The commissioning works are done in exact accordance with CIBSE Commissioning Codes or ASHRAE Commissioning Guideline 1-1996 (for mechanical services only) and CIBSE Commissioning Codes for the other Services.

The design team and contractor will transfer project knowledge to the building owner/manager through all of the following:

- Documented design intent
- As-built drawings
- Operations and Maintenance Manual
- Commissioning Report
- Training of building management staff

1.12.2 Building Users Guide

A simple building users guide (BUG) will be produced which will include information relevant to building owners, occupants and tenants' representatives.

The guide will include information on the following:

- Passive features for comfort and energy efficiency
- Operating appliances and building services for energy and water efficiency
- Local transport including trams, buses, trains, and pedestrian and bike routes
- Waste and recycling
- Building-wide features such as renewable energy and rainwater harvesting
- Selection of sustainable and low toxicity materials
- Links to further and updated information

1.12.3 Environmental Management

The builder will be required to institute an environmental management plan (EMP) to manage and minimise environmental risks during construction. In addition, the builder will be ISO 14001 accredited for Environmental Management Systems, assuring quality in environmental management systems and processes.

1.12.4 Energy Management and Monitoring

A large proportion of energy can be wasted by a poorly tuned building, which can be difficult to determine without adequate sub metering. To enable the building energy to be monitored for fluctuations from normal operation (fault indication) and observe variations from the design, sub meters will be provided on all base building energy systems and substantial loads, including:

- Mechanical
  - Common area supply air system
  - Car park ventilation
- Electrical
  - Common area lighting and power
  - External lighting

- Vertical Transportation
  - Passenger lifts
  - Car lifts

- Individual meters for each dwelling / tenancy, plus smart metering as per Green Star Design and As Built requirements

1.13 ESD CONSULTANT

An ESD consultant has been engaged from the beginning of the project to set the ESD strategy, work closely with the project team to ensure the initiatives are incorporated, and provide assurance at the conclusion of design. The ESD consultant is a Green Star Accredited and will provide sustainability advice from the schematic design phase through to construction completion.

2. Green Star Benchmarking

Green Star – Design & As Built provides a framework for benchmarking the ESD achievement of a building design. The tool includes credits under a range of categories which may be used to guide ESD and tally a score which corresponds to a level of achievement as follows:

- 30-44 weighted point – 3 Star Good Practice
- 45-59 weighted points – 4 Star Best Practice
- 60-74 weighted points – 5 Star Australian Excellence
- 75+ weighted points – 6 Star World Leadership

Aside from the categories, Green Star encourages the adoption of additional and/or innovative design features which are not included in the tool, or which take an alternative interpretation of the credits where the intent of the credit is met.

The project will aim to meet an equivalent Green Star standard of 4 Stars and will make best endeavours to achieve this. The following summary provides a potential pathway towards meeting an equivalent Green Star 4-star design.

As the project progresses, the pathway may change as some credits targeted become replaced by others, but the objective of achieving Green Star Design & As Built 4-star equivalence will not change.

Table 13: Summary of Green Star Benchmarking

Category	Weighted Points Targeted	
	Non-Residential	Residential
Management	11	11
Indoor Environment Quality	10	11
Energy	6	7
Transport	5	5
Water	6	6
Materials	4	4
Land Use & Ecology	3.2	3.2
Emissions	3	3
Innovation	4	4
TOTAL	**55.2**	**54.2**

Refer to Appendix A for the full Green Star pathway.

3. BESS Assessment

A BESS assessment has been completed for the development to provide a guide to the sustainability initiatives that will be implemented in the design.

In summary, the development achieves a total BESS score of 57 out of 100 (Table 14). This highlights the high commitment to sustainable development in the design.

Table 14: BESS summary

Category	Achieved
Management	55%
Energy	66%
Water	75%
Stormwater	100%
IEQ	51%
Transport	57%
Waste	33%
Urban Ecology	21%
Innovation	0%
Project sustainability score	**57%**

Refer to Appendix B for the full BESS results.

4. Implementation Schedule

The following implementation schedule is provided to provide guidance on the responsibilities for implementation of the ESD initiatives outlined in this report:

Table 15: Implementation Schedule

Item	Responsible Party
Natural Ventilation Natural Lighting	Architect
Individual Control of Indoor Environment	Architect Services Engineer
Mechanical Ventilation	Services Engineer
Thermal Insulation Shading	Architect
House Energy Rating	Architect ESD Consultant
Heating / Cooling / AC systems Domestic Hot Water Artificial Lighting Control Systems Energy Management and Metering	Services Engineer
Water Efficient Fixtures	Architect
Minimise Dead Legs	Services Engineer Builder
Public Area Water Consumption	Services Engineer Owner's Corporation
Rainwater Harvesting	Services Engineer Architect
Materials Selection	Architect Builder
Reduction of VOC's	Architect Builder
Bicycle Use	Architect
Waste Management	Waste Management Consultant
Construction Waste Management	Builder
Topsoil Management	Builder
Building Operation and Maintenance	Services Engineer Builder Equipment Suppliers
Building Users Guide	Services Engineer Waste Management Engineer Architect
Commissioning of Building Systems	Builder

Appendix A – Green Star Pathway

EBV- Green Star Action Matrix - As Built Version 1.2

KEY POINTS SUMMARY	Points Available	Non Residential Target	Residential Target
Core Credits	100	48.2	50.2
Innovation Credits	10	4.0	4.0
	TOTAL	52.2	54.2

Green Star	Green Star Credit			Points Available	Non Residential Target	Residential Target	Credit Requirements	CLIENT	HC	ARCH	ESD	MECH	ELEC	HYD	FIRE	CIVIL	LAND	ACC	VT	Comment
Management	Accredited Professional	1.0	Accredited Professional	1	1	1	GSAP to be appointed throughout project, from schematic design to construction to completion.													Non-residential and Residential: This credit is obtained with ADP Consulting's appointment Note:Client to sign GSAP Appointment Letter.
	Commissioning and Tuning	2.0	Environmental Performance Targets	N/A	Complies	Complies	Owners Project Requirement (OPR) document written which summarises the targets for the environmental performance of the project.													Note:AOPR documentation confirms ensure targets are will be met.
		2.1	Services and Maintainability Review	1	1	1	A comprehensive services and maintainability review of the project to be performed during design stage and prior to construction.													Non-residential and Residential: To be undertaken by the ICA.
		2.2	Building Commissioning	1	1	1	Pre-commissioning, commissioning and quality monitoring for all building services (BMS, mechanical, electrical and hydraulic) in accordance with CIBSE or ASHRAE. Full re-commissioning is undertaken 12 months after practical completion. Monthly monitoring undertaken and outcomes reported.													Non-residential and Residential: Confirmation required that ICA has been commissioned. Note:Full Commissioning to be ensured in all specs, plus quote for work.
		2.3	Building Systems Tuning	1	1	1	Commitment to a 12month seasonal building tuning period with a minimum of quarterly reviews and final re-commissioning at 12 months													Non-residential and Residential Note:Documentation to be provided that confirms Building Systems tuning will be undertaken.
	Building Information	4.1	Building Operations and Maintenance information	1	1	1	Building O and M manual and a CIBSE TM31 Building Log Book to be produced and made available to building owner and occupants. An Owners Project Requirement document is to be developed, including the environmental targets for the project													Non-residential and Residential Note: Development of logbook in line with CIBSE TM31.
		4.2	Building User Information	1	1	1	Relevant design team members have to commit to producing a BUG. It is to be made available to all relevant stakeholders.													Non-residential and Residential Note: Development of BUG by relevant design team
	Commitment to Performance	5.1	Environmental Building Performance	1	1	1	Environmental reporting goals (2 at least) to be set for the building, including GHG / Energy Targets, Water targets and Waste targets in use Best practice green lease agreements required for all tenants to understand and comply with the commitment targets.													Non-residential and Residential Note:Client confirmation required that environmental performance targets are acceptable and will be committed to.
	Metering and Monitoring	6.0	Metering strategy	N/A	Complies	Complies	Accessible metering to all energy and water common uses and major uses within the building. Energy metering to include electricity, gas and DHW.													Non-residential and Residential Note - Metering (Including Electricity, Gas and DHW) inlcuded wihtin design.
		6.1	Monitoring Systems	1	1	1	Water and Energy metering and monitoring system to be in place. Common uses for energy includes anything greater than 5% of the total energy or 100kW where previously it was 100kVA. Also meters for anything greater than 10% of the water use													Non-residential and Residential Note:Monitoring systems to be provided - Services Team to confirm Energy Monitoring system Specification.
	Construction Environmental Management	7.0	Environmental Management Plan	N/A	Complies	Complies	The conditional requirement for a project specific Environmental Management Plan (EMP) for construction to be developed and implemented.													Non-residential and Residential Note:Hacer has provided an EMP. Regular inspections must take place during construction.
		7.1	Environmental Management System	1	1	1	Builder to have ISO 14 001 Environmental Management System													Non-residential and Residential Note: Hacer holds IS014001 certification
		7.2	High Quality Staff Support	1	1	1	Promote positive mental and physical health outcomes of site activities and culture of site workers, through programs and solutions on site; and Enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs.													Non-residential and Residential Note: Head Contractor to confirm that mental health & wellbeing initiatives will be implemented onsite, in addition to contractor training around the sustainability aspects of the project.
	Operational Waste	8A	Performance pathway - Specialist Plan	1	1	1	A comprehensive Waste and Recycling Management Plan to be provided that calculates the reduction in the amount, by weight, of the buildings overall operational waste AND confirm the waste storage facilities are provided that meets the general space, access, amenity and management requirements.													Non-residential and Residential Note:A OWMP to be produced that includes operational waste targets for the building and diversion percentage from landfill
Category Total				14	11	11														

EBV- Green Star Action Matrix - As Built Version 1.2

Green Star	Green Star Credit			Points Available	Non Residential Target	Residential Target	Credit Requirements	CLIENT	HC	ARCH	ESD	MECH	ELEC	HYD	FIRE	CIVIL	LAND	ACC	VT	Comment
IEQ	Indoor Air Quality	9.1	Ventilation System Attributes	1	1	1	The ventilation system to be designed to mitigate the entry of outdoor pollutants, for ease of maintenance and cleaning; and will be cleaned prior to occupation and use. Design to comply with ASHRAE 62.1-2003 in regards to minimum separation distances between pollution sources and outdoor air intakes.													Non-residential and Residential Note: To be included within ADP's Design. Requirements of ASHRAE 62.1 to be noted
		9.3	Exhaust or Elimination of Pollutants	1	1	1	Methods will be included to remove pollutants directly to the outdoors, e.g. ducted kitchen exhaust													Exhausts to meet requirements.
	Acoustic Comfort	10.1	Internal Noise Levels	1	1	1	Internal noise levels to be no more than 5dB(A) above the "satisfactory" sound levels provided in Table 1 of AS/NZS 2107:2000													Non-residential and Residential Note: Internal noise levels targets have been deemed feasible within the scope of works. Credit achievable.
	Lighting Comfort	11.0	Minimum Lighting Comfort	N/A	Complies	Complies	All lights on the project to be flicker free and accurately address the perception of colour in the space													Non-residential and Residential Note: All requirements included within design Credit achievable.
		11.1	General Illuminance and Glare Reduction	1	1	1	All lighting levels and quality will comply with best practice guidelines. Efforts to eliminate glare will be implemented, and a Unified Glare Rating (UGR) will be calculated													Non-residential and Residential Note:All requirements included within design. Confirmation of compliance to be provided by lighting designer. Credit achievable.
		11.2	Surface Illuminance	1	1	1	Nominated areas to have a combination of lighting and surfaces to improve uniformity of lighting to give visual interest													Non-residential and Residential Note: The installed fittings all to have fittings with rated colour variation not exceeding 3 MacAdam Ellipses
		11.3	Localised Lighting Control	1	1	1	Occupants to have the ability to control the lighting in their immediate environment													Note Non-residential and Residential: Requirement included within design. Achievable for both areas. Credit achievable.
	Visual Comfort	12.0	Glare Reduction	N/A	-	-	Compliance requirement for glare reduction to ALL facades through a combination of blinds, screens, fixed devices, or other means.													Non-residential: Blinds / shading strategy TBC. Residential: All apartments will have blinds fitted for glare control.
		12.2	Views	1	1	1	60% of nominated area to have clear line of sight to external view													Residential: Credit achievable. Requirement included within design.
	Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	1	1	1 point is targeted for reduced VOCs (95% of all paints, carpets, adhesives and sealants meet the Total Volatile Organic Compound (TVOC) Content Limits outlined by Green Star													Non-residential and Residential Note:VOC limits for paints, adhesives, sealants and carpets to be specified by the design team. Note: Zero VOC Innovation Credit targeted. Credit achievable.
		13.2	Engineered Wood Products	1	1	1	All engineered wood products (particleboard, plywood, veneer, MDF and decorative overlaid wood panels) to have low formaldehyde emissions or contain no formaldehyde													Non-residential and Residential Note:All engineered wood products meet low formaldehyde limits to be specified by design team. Credit achievable.
	Thermal Comfort	14.1	Thermal Comfort	1	1	1	80% occupants satisfied (PMV analysis)													Non-residential Note: PMV modelling undertaken: PMV within +/-1 deemed achievable within Non-residential area. Residential: Average 7.5 Star NatHERS ratings and above Credit achievable.
		14.2	Advanced Thermal Comfort	1	0	TBC	90% occupants satisfied (PMV analysis)													Note: ADP note that Advanced Thermal Comfort parameters are difficult to achieve. ADP to undertake modelling. Resiential: Apartments require average 8 Star NatHERS rating.
Category Total				17	10	11														
Energy	Greenhouse Gas Emissions	15B	NatHERS Pathway	12	N/A	6	NatHERS is for Class 2 buildings. Green Star requires 6.5 star average and minimum 5.5 star rating for apartments. Up to 6 points for FirstRate improvements. Another 6 points for the following: - Lighting power density 10% less than BCA Section J, independent light switch in each room, automatic common area lighting control - AC equipment at least 3 star - Rated capacity of AC equipment does not exceed design heating capacity by more than 20% and design cooling capacity by more than 10% - DHW uses natural gas or heat pump with COP>3.5 - 30% renewable contribution to DHW - Appliances with minimum Energy Rating of 1-star below the maximum Energy Rating available for that appliance type and capacity													Project is targeting 6 points for the following: - Average NatHERS Ratings above 7.5 Star - Lighting power density 10% less than BCA Section J, independent light switch in each room, automatic common area lighting control - AC equipment at least 3 star - Rated capacity of AC equipment does not exceed design heating capacity by more than 20% and design cooling capacity by more than 10% - DHW uses natural gas or heat pump with COP>3.5
		15E.1	Modelled Performance Pathway - Multiple Pathways	20	5	-	15E Reference Building Pathway - Up to 20 points are available where there is a specified reduction in the predicted energy consumption and GHG emissions of the proposed building. Points are awarded based both on improvements to the building's façade, and on the project's predicted ability to reduce its operating energy consumption and emissions towards 'net zero'.													Green Star Modelling required to demonstrate points achieved through the multiple pathway GHG Emissions calculator. Non-residential: ADP to undertake modelling. Residential: NatHERS modelling undertaken. Can achieve additional points with Green Power Commitment.
	Greenhouse Gas Emissions	16B	Performance Pathway - Peak Energy Reduction	2	1	1	Demonstrate that the project's predicted peak electricity demand has been reduced below that of a 'Reference Building': -1 point is awarded for a 20% reduction in peak electricity demand. -2 points is awarded for a 30% reduction in peak electricity demand.													All Areas: PV added to all buildings
Category Total				34	6	7														
Transport	Sustainable Transport	17B.1	Prescriptive Pathway - Access by Public Transport	3	1	1	Green Star Public Transport Calculator utilised to access accessibility for the site.													Note: Green Star Public Transport Calculator yielded 1 point for the project site. 1 credit achievable.
		17B.2	Prescriptive Pathway - Parking Provision	1	1	1	Car parking to be less than Council / Green Star requirements													Credit achievable.
		17B.3	Prescriptive Pathway - Low Emission Vehicle Infrastructure	1	1	1	Parking spaces and/or dedicated infrastructure provided to support the uptake of low-emission vehicles. 15% parking for fuel efficient vehicles 5% for Electric vehicles													Note: EV Car Charging added to the development
		17B.4	Prescriptive Pathway - Active Transport Facilities	1	1	1	No. of EOT facilities to be at least equal to Greenstar requirement.													Requirement for Bikes: Project has more bike racks than Green Star minimum requirement. Credit achievable.

EBV- Green Star Action Matrix - As Built Version 1.2

Green Star	Green Star Credit			Points Available	Non Residential Target	Residential Target	Credit Requirements	CLIENT	HC	ARCH	ESD	MECH	ELEC	HYD	FIRE	CIVIL	LAND	ACC	VT	Comment
		17B.5	Prescriptive Pathway - Walkable Neighbourhoods	1	1	1	Walk score = 81 (greater than minimum Green Star requirement of 80)													1 credit if project used this pathway. Credit achievable.
Category Total				10	5	5														
Water	Potable Water	18B.1	Prescriptive Pathway - Sanitary Fixture Efficiency	1	1	1	Green Star requirements: 5 Star taps / urinals, 4 Star toilet, 3 Star showers, 4 Star clothes washers, 5 Star dish washers													Note:Architecture to specify the correct fixtures
		18B.2	Prescriptive Pathway - Rainwater Reuse	1	1	1	Rainwater tank sized to achieve STORM score of 100%													Note: Rainwater tank sized using Melbourne Water STORM Tool.
		18B.3	Prescriptive Pathway - Heat Rejection	2	2	2	No water based heat rejection.													Note:Minimal waterless heat rejection.
		18B.4	Prescriptive Pathway - Landscape Irrigation	1	1	1	Drip irrigation with moisture sensor override to be installed													Note:Landscaping Architecture confirms irrigation strategy
		18B.5	Prescriptive Pathway - Fire System Test Water	1	1	1	Fire system to include temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. If sprinkler systems are installed, each floor must be fitted with isolation valves or shut-off points for floor-by-floor													Note: Included within the design
Category Total				12	6	6														

EBV- Green Star Action Matrix - As Built Version 1.2

Green Star	Green Star Credit			Points Available	Non Residential Target	Residential Target	Credit Requirements	CLIENT	HC	ARCH	ESD	MECH	ELEC	HYD	FIRE	CIVIL	LAND	ACC	VT	Comment
Materials	Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	1	1	95% of the building's steel to be sourced from a Responsible Steel Maker		■											Non-residential and Residential Note:ASI Accredited steel contractor/maker to be used.. Credit achievable.
		20.2	Timber Products	1	1	1	Timber to be certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification		■	■										Non-residential and Residential Note:Requirements to be inlcuded within Specifications. Credit achievable.
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1	1	90% (by cost) of all cables, pipes, flooring and blinds in a project either: - Do not contain PVC and have an Environmental Product Declaration (EPD); or - Meet Best Practice Guidelines for PVC.		■	■									Non-residential and Residential Note: Requirements to be included within Specifications. Credit achievable.
	Construction and Demolition Waste	22B	Percentage Benchmark	1	1	1	90% of waste generated during construction and demolition diverted from landfill.		■											Non-residential and Residential Note: Must be tracked by Head Contractor. Credit achievable
Category Total				14	4	4														
Land Use and Ecology	Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	N/A	Complies	Complies	No critically endangered, endangered, or vulnerable species, or ecological communities were present on the site at time of purchase	■	■											There are no critically endangered or vulnerable species, or ecological communities were present on the site at the time of purchase. Note:Client to provide information on time of purchase site conditions. Credit achievable.
		23.1	Ecological Value	3	1.2	1.2	Green Star Ecology Calculator will yield points for the project - based on a comparison of pre & post development landscaping details.				■									As per calculator
	Sustainable Sites	24.0	Conditional Requirement	N/A	Complies	Complies	The project site does not include old growth forest or wetland of 'High National Importance'	■												Non-residential and Residential Note:Client to confirm site characteristics at time of purchase. Requirement achievable.
		24.1	Reuse of Land	1	1	1	Use of Previously Developed Land	■												Note: Project site is 100% Previously Developed Land. Credit achievable.
	Heat Island Effect	25.0	Heat Island Effect	1	1	1	At least 75% of the total project site area to comprises building or landscaping elements that reduce the impact of heat island effect. Green Roof / high SRI roofing materials required.			■							■			Note:Shale Grey inlcuded within the design Credit TBC.
Category Total				5	3.2	3.2														
Emissions	Stormwater	26.1	Reduced Peak Discharge	1	1	1	Post-development peak event discharge from the site does not exceed the pre-development peak event discharge. STORM score of minimum 100%.				■					■				ALL: This point is demonstrated using Melbourne Water Storm Tool Credit achievable.
		26.2	Reduced Pollution Targets	1	-	-	Where the first point has been achieved and all stormwater discharged from site meets specified Pollution Reduction Targets.				■					■				ALL: Credit not targeted. Additional filtration system required. Credit achievable.
	Light Pollution	27.0	Light Pollution to Neighbouring Bodies	N/A	Complies	Complies	All outdoor lighting on the project to comply with AS 4282:1997.						■							Requirement achievable
		27.1	Light Pollution to Night Sky	1	1	1	Upward Light Output Ratio (ULOR) no more than 5% or no more than 0.5Lux to site boundary and 0.1Lux to 4.5m into night sky						■							Requirement to ensure minimal light pollution from the building
	Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	1	1	This credit is achieved via one of the following: 1) Building is naturally ventilated and does not require a heat rejection system 2) Waterless heat rejection: no cooling tower, evaporative coolers 3) Any water-based heat rejection system includes measures for Legionella control and a Legionella Risk Management Plan to be provided for the system							■						Project is likely to use waterless heat rejection. If unable to fully avoid water-based heat rejection due to size of project. Pathway (3) to be investigated.
Category Total				5	3	3														
Innovations	Exceeding Green Star Benchmarks	30C	Indoor Pollutants: Ultra-Low VOC paints	1	1	1	Over 50% of paint (by cost) to have a TVOC content of <5g/L		■	■										Credit Achievable
			Financial Transparency	1	1	1	To be completed by client and Head Contractor	■	■											Note:Discuss project design, documentation and construction costs to GBCA.
			High Performance Site Office	1	1	1			■											Demountable site sheds compliant with at least 75% of the requirements in the 'High Performance Site Office Checklist'.
			Energy Metering Integrity	1	1	1		■				■								Validation of metering network via calibration, testing, commissioning, etc.
Category Total				10	4	4														

Appendix B – BESS Assessment

BESS Report

This BESS report outlines the sustainable design commitments of the proposed development at Stage 3, 127-139 Nicholson Street East Brunswick VIC 3057. 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.

Stage 3, 127-139 Nicholson Street, East Brunswick
3057 East Brunswick

Site area: 12680 m^2 ·
Building Floor Area: 27915 m^2 ·
Date of Assessment: 16 Jul 2020 ·
Version: V3, 1.6.2-B.290 ·
Applicant: d.kim@adpconsulting.com.au

Project Identifier
15762DF4
(Previously #39398)

Published
http://bess.net.au/projects/15762DF4-V2

Your BESS score is

+57%

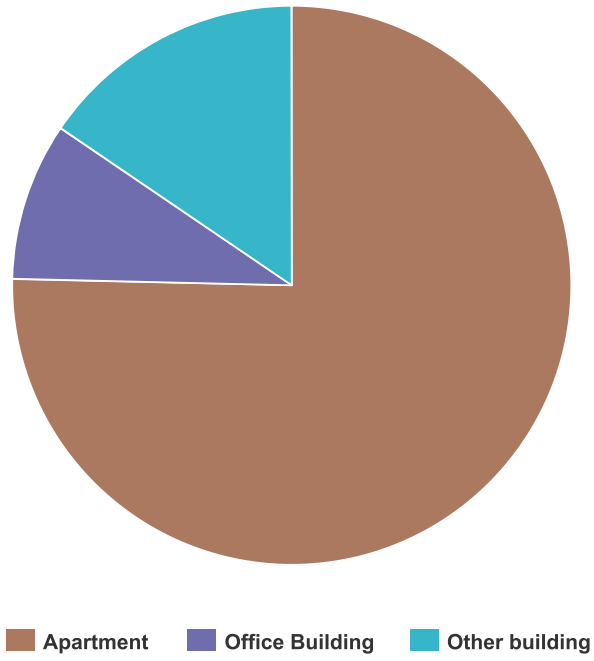
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

50% +
Best Practice

70% +
Excellence

% of Total	Category	Score	Pass
2 %	Management	55 %	
7 %	Water	75 %	✔
18 %	Energy	66 %	✔
14 %	Stormwater	100 %	✔
8 %	IEQ	51 %	✔
5 %	Transport	57 %	
2 %	Waste	33 %	
1 %	Urban Ecology	21 %	
0 %	Innovation	0 %	

Building Composition



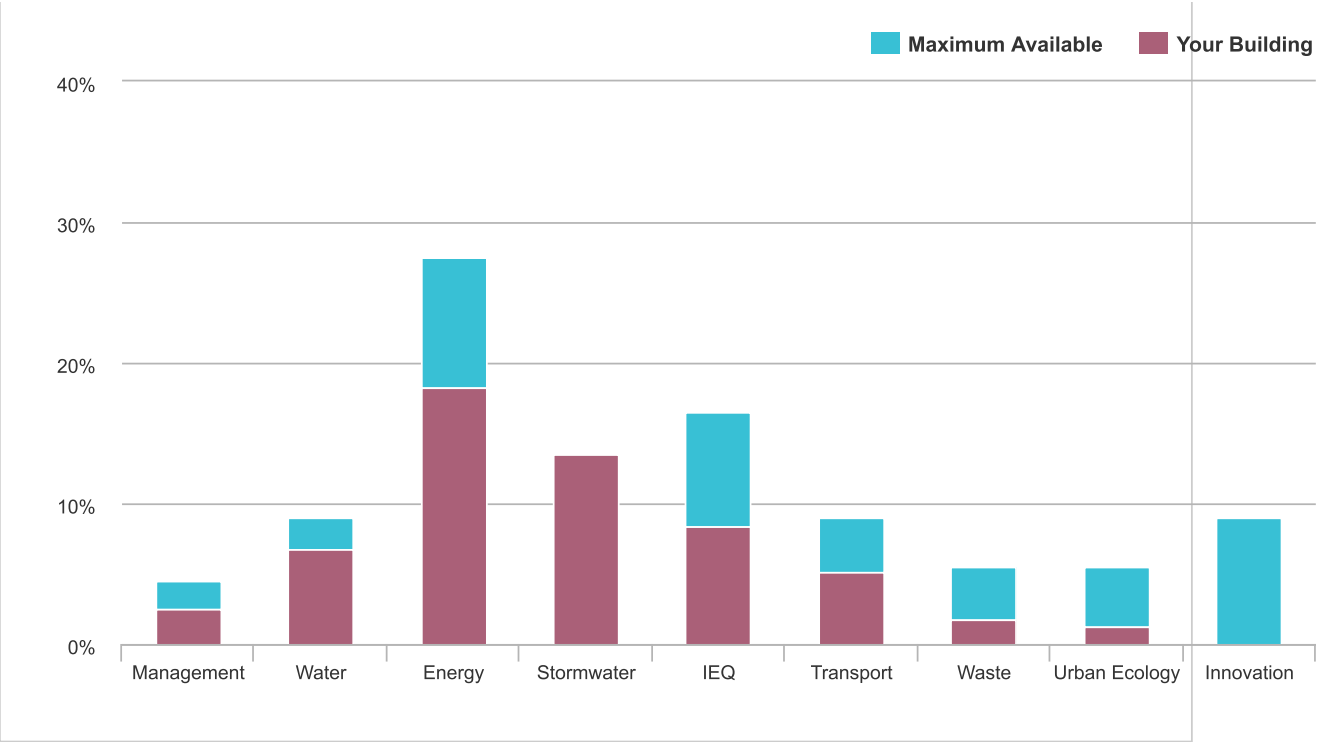
Dwellings

Type	Name	Quantity	Area
Apartment	Lot 3 - 1 Bed	7	55 m^2
Apartment	Lot 3 - 2 Bed	21	75 m^2
Apartment	Lot 3 - 3 Bed	18	95 m^2
Apartment	Lot 9, 10 - 1 Bed	43	55 m^2
Apartment	Lot 9, 10 - 2 Bed	54	75 m^2
Apartment	Lot 9, 10 - 3 Bed	5	95 m^2
Apartment	Lot 4 - 1 Bed	61	55 m^2
Apartment	Lot 4 - 2 Bed	57	75 m^2
Apartment	Lot 4 - 3 Bed	30	95 m^2

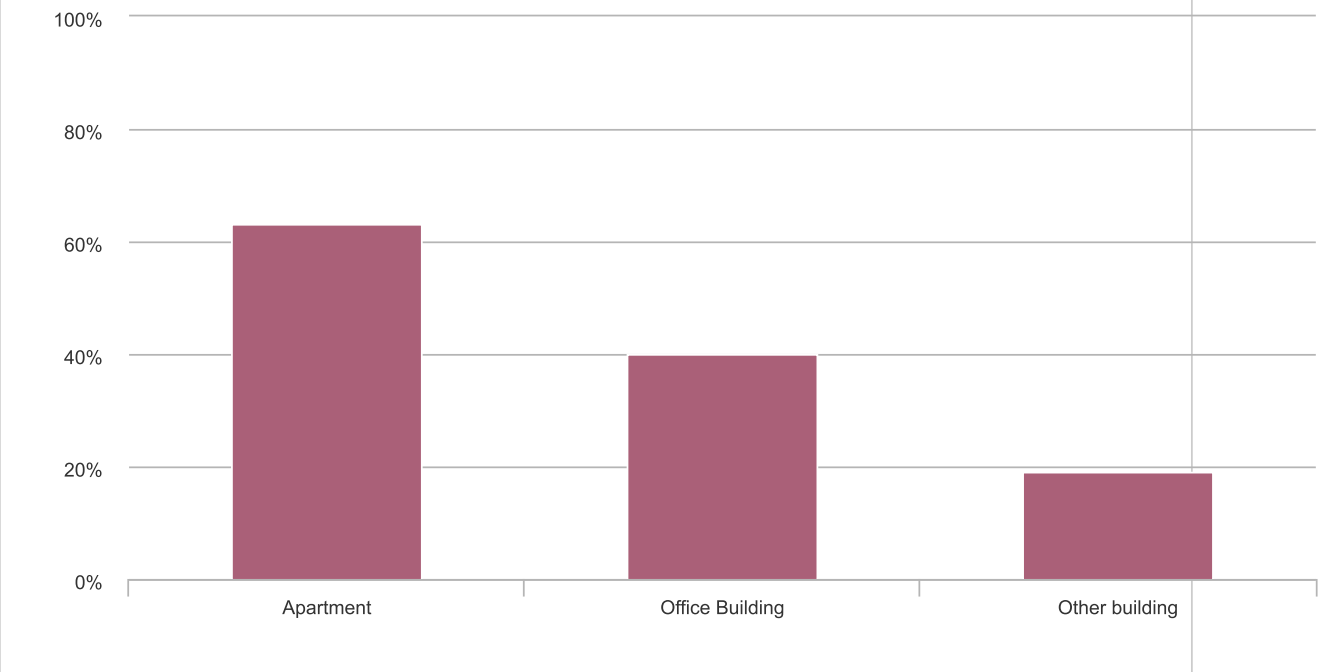
Non-Residential Spaces

Other building	4,325 m^2
Office Building	2,549 m^2

How did this Development Perform in each Environmental Category?



How does each Dwelling or Non-Residential Space type perform?



Sustainable design commitments by category

The sustainable design commitments for this project are listed below. These are to be incorporated into the design documentation and subsequently implemented.

Management

55% - contributing 2% to overall score

Credit	Disabled	Scoped out	Score
Management 2.2 Thermal Performance Modelling - Multi-Dwelling Residential			100 %
Management 2.3 Thermal Performance Modelling - Non-Residential			37 %
Management 3.1 Metering			100 %
Management 3.2 Metering			37 %
Management 3.3 Metering			85 %
Management 4.1 Building Users Guide			100 %

Management 2.2 Thermal Performance Modelling - Multi-Dwelling Residential

100%

Score Contribution	This credit contributes 18.8% towards this section's score.
Aim	To encourage and recognise developments that have used modelling to inform passive design at the early design stage

Questions

Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings? *

Apartment
Yes

Management 2.3 Thermal Performance Modelling - Non-Residential

37%

Score Contribution	This credit contributes 6.2% towards this section's score.
Aim	To encourage and recognise developments that have used modelling to inform passive design at the early design stage

Questions

Has preliminary modelling been undertaken in accordance with either BCA Section J (Energy Efficiency), NABERS or Green Star? *

Office Building
Yes

Management 3.1 Metering

100%

Score Contribution	This credit contributes 9.4% towards this section's score.

Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have utility meters been provided for all individual dwellings? *

Apartment
Yes

Management 3.2 Metering 37%

Score Contribution	This credit contributes 3.1% towards this section's score.
Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have utility meters been provided for all individual commercial tenants? *

Office Building
Yes

Management 3.3 Metering 85%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have all major common area services been separately submetered? *

Apartment	**Office Building**
Yes	Yes

Management 4.1 Building Users Guide 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	To encourage and recognise initiatives that will help building users to use the building efficiently

Questions

Will a building users guide be produced and issued to occupants? *

Project wide
Yes

Water

75% - contributing 7% to overall score

Credit	Disabled	Scoped out	Score
Water 1.1 Potable Water Use Reduction (Interior Uses)			50 %
Water 2.1 Rainwater Collection & Reuse (Additional Uses)			100 %
Water 3.1 Water Efficient Landscaping			100 %
Water 4.1 Building Systems Water Use Reduction			100 %

Water Approachs

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

	Other Buildings	Lot 3 - 1 Bed	Lot 3 - 2 Bed
Showerhead	Scope out	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)
Bath	Scope out	Scope out	Scope out
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Dishwashers	Scope out	>= 5 Star WELS rating	>= 5 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
Urinals	>= 5 Star WELS rating	Scope out	Scope out
Washing Machine Water Efficiency	Scope out	>= 4 Star WELS rating	>= 4 Star WELS rating
Connected to which Tank	Stage 3	Stage 3	Stage 3
Rainwater connected to: Toilets	Yes	Yes	Yes
Rainwater connected to: Laundry (washing machine)	No	No	No

	Other Buildings	Lot 3 - 1 Bed	Lot 3 - 2 Bed
Rainwater connected to: Hot Water System	No	No	No

	Lot 3 - 3 Bed	Office Building	Lot 9, 10 - 1 Bed
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)	Scope out	3 Star WELS (>= 6.0 but <= 7.5)
Bath	Scope out	Scope out	Scope out
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Dishwashers	>= 5 Star WELS rating	Scope out	>= 5 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
Urinals	Scope out	>= 5 Star WELS rating	Scope out
Washing Machine Water Efficiency	>= 4 Star WELS rating	Scope out	>= 4 Star WELS rating
Connected to which Tank	Stage 3	Stage 3	Stage 3
Rainwater connected to: Toilets	Yes	Yes	Yes
Rainwater connected to: Laundry (washing machine)	No	No	No
Rainwater connected to: Hot Water System	No	No	No

	Lot 9, 10 - 2 Bed	Lot 9, 10 - 3 Bed	Lot 4 - 1 Bed
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (> 6.0 but <= 7.5)
Bath	Scope out	Scope out	Scope out
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	> 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	> 5 Star WELS rating
Dishwashers	>= 5 Star WELS rating	>= 5 Star WELS rating	> 5 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	> 4 Star WELS rating
Urinals	Scope out	Scope out	Scope out
Washing Machine Water Efficiency	>= 4 Star WELS rating	>= 4 Star WELS rating	> 4 Star WELS rating
Connected to which Tank	Stage 3	Stage 3	Stage 3
Rainwater connected to: Toilets	Yes	Yes	Yes
Rainwater connected to: Laundry (washing machine)	No	No	No
Rainwater connected to: Hot Water System	No	No	No

	Lot 4 - 2 Bed	Lot 4 - 3 Bed

	Lot 4 - 2 Bed	Lot 4 - 3 Bed
Showerhead	3 Star WELS (> 6.0 but <= 7.5)	3 Star WELS (> 6.0 but <= 7.5)
Bath	Scope out	Scope out
Kitchen Taps	> 5 Star WELS rating	> 5 Star WELS rating
Bathroom Taps	> 5 Star WELS rating	> 5 Star WELS rating
Dishwashers	> 5 Star WELS rating	> 5 Star WELS rating
WC	> 4 Star WELS rating	> 4 Star WELS rating
Urinals	Scope out	Scope out
Washing Machine Water Efficiency	> 4 Star WELS rating	> 4 Star WELS rating
Connected to which Tank	Stage 3	Stage 3
Rainwater connected to: Toilets	Yes	Yes
Rainwater connected to: Laundry (washing machine)	No	No
Rainwater connected to: Hot Water System	No	No

Rainwater Tanks

	Stage 3
Name	Stage 3
What is the total roof area connected to the rainwater tank? Square Metres	4878.0
Tank Size Litres	275000.0
Irrigation area connected to tank Square Metres	0.0
Is connected irrigation area a water efficient garden?	Yes

Water 1.1 Potable Water Use Reduction (Interior Uses) 50%

Score Contribution	This credit contributes 50.0% towards this section's score.
Aim	Water 1.1 Potable water use reduction (interior uses) What is the reduction in total water use due to efficient fixtures, appliances, and rainwater use? To achieve points in this credit there must be >25% potable water reduction. You are using the built in calculation tools. This credit is calculated from information you have entered above.
Criteria	Percentage reduction in potable water use

Calculations

Annual Water Consumption (kL) (Reference) *

Project wide
39928

Annual Water Consumption (kL) (Proposed) *

Project wide

26939

% Reduction in Potable Water Consumption * Percentage %

Project wide

32 %

Water 2.1 Rainwater Collection & Reuse (Additional Uses) 100%

Score Contribution	This credit contributes 25.0% towards this section's score.
Aim	What is the additional reduction in potable (mains) water use due to rainwater harvesting? Additional water uses for rainwater include non-potable demands such as irrigation, pools, commercial process uses and taps for washdown. Note: tank water will only be available for additional uses if it not required for internal uses. If the property uses an alternative water source, the alternative water source is deemed to meet 90% of additional non-potable water use requirements. You are using the built in calculation tools. This credit is calculated from information you have entered above in the rainwater tanks section.
Criteria	What is the additional reduction in potable (mains) water use due to using rainwater or an alternative water source?

Calculations

Rainwater collection & reuse (additional uses) * Percentage %

Project wide

100 %

Water 3.1 Water Efficient Landscaping 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	Are water efficiency principles used for landscaped areas? This includes low water use plant selection (e.g. xeriscaping) and specifying water efficient irrigation (e.g. drip irrigation with timers and rain sensors). Note: food producing landscape areas and irrigation areas connected to rainwater or an alternative water source are excluded from this section.

Questions

Will water efficient landscaping be installed? *

Project wide

Yes

Water 4.1 Building Systems Water Use Reduction 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	Will the project minimise water use for building systems such as evaporative cooling and fire testing systems?

Questions

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? *

Project wide
Yes

Energy 66% - contributing 18% to overall score

Credit	Disabled	Scoped out	Score
Energy 1.1 Thermal Performance Rating - Non-Residential			12 %
Energy 1.2 Thermal Performance Rating - Residential			50 %
Energy 2.1 Greenhouse Gas Emissions			100 %
Energy 2.3 Electricity Consumption			100 %
Energy 2.4 Gas Consumption			100 %
Energy 3.1 Carpark Ventilation			100 %
Energy 3.2 Hot Water			100 %
Energy 3.6 Internal Lighting - Residential Multiple Dwellings			100 %
Energy 3.7 Internal Lighting - Non-Residential			37 %
Energy 4.1 Combined Heat and Power (cogeneration / trigeneration)			N/A
Energy 4.2 Renewable Energy Systems - Solar			75 %

Dwellings Energy Approachs

What approach do you want to use for Energy?	Use the built in calculation tools
Are you installing a solar photovoltaic (PV) system?	Yes
Are you installing any other renewable energy system(s)?	No
Gas Supply	Natural Gas
Are you installing a cogeneration or trigeneration system?	No

Dwelling Energy Profiles

	Lot 3 - 1 Bed	Lot 3 - 2 Bed	Lot 3 - 3 Bed
Below the floor is	Another Occupancy	Another Occupancy	Another Occupancy
Above the ceiling is	Another Occupancy	Another Occupancy	Another Occupancy
Exposed sides	1	2	2
NatHERS Annual Energy Loads - Heat MJ/sqm	42.0	42.0	42.0
NatHERS Annual Energy Loads - Cool MJ/sqm	20.0	20.0	20.0
NatHERS star rating	7.7	7.7	7.7
Type of Heating System	E Reverse cycle ducted	E Reverse cycle ducted	E Reverse cycle ducted
Heating System Efficiency	4 Star	4 Star	4 Star
Type of Cooling System	Refrigerative ducted	Refrigerative ducted	Refrigerative ducted
Cooling System Efficiency	4 Stars	4 Stars	4 Stars
Type of Hot Water System	I Gas Instantaneous 5 star	I Gas Instantaneous 5 star	I Gas Instantaneous 5 star
% Contribution from solar hot water system	0 %	0 %	0 %
Clothes Line	A No drying facilities	A No drying facilities	A No drying facilities
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer

	Lot 9, 10 - 1 Bed	Lot 9, 10 - 2 Bed	Lot 9, 10 - 3 Bed
Below the floor is	Another Occupancy	Another Occupancy	Another Occupancy
Above the ceiling is	Another Occupancy	Another Occupancy	Another Occupancy
Exposed sides	1	2	2
NatHERS Annual Energy Loads - Heat MJ/sqm	70.0	70.0	70.0
NatHERS Annual Energy Loads - Cool MJ/sqm	30.0	30.0	30.0
NatHERS star rating	6.5	6.5	6.5
Type of Heating System	E Reverse cycle ducted	E Reverse cycle ducted	E Reverse cycle ducted
Heating System Efficiency	4 Star	4 Star	4 Star
Type of Cooling System	Refrigerative ducted	Refrigerative ducted	Refrigerative ducted
Cooling System Efficiency	4 Stars	4 Stars	4 Stars
Type of Hot Water System	I Gas Instantaneous 5 star	I Gas Instantaneous 5 star	I Gas Instantaneous 5 star
% Contribution from solar hot water system	0 %	0 %	0 %
Clothes Line	A No drying facilities	A No drying facilities	A No drying facilities
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer

	Lot 4 - 1 Bed	Lot 4 - 2 Bed	Lot 4 - 3 Bed
Below the floor is	Another Occupancy	Another Occupancy	Another Occupancy

	Lot 4 - 1 Bed	Lot 4 - 2 Bed	Lot 4 - 3 Bed
Above the ceiling is	Another Occupancy	Another Occupancy	Another Occupancy
Exposed sides	1	2	2
NatHERS Annual Energy Loads - Heat MJ/sqm	35.0	35.0	35.0
NatHERS Annual Energy Loads - Cool MJ/sqm	20.0	20.0	20.0
NatHERS star rating	7.9	7.9	7.9
Type of Heating System	E Reverse cycle ducted	E Reverse cycle ducted	E Reverse cycle ducted
Heating System Efficiency	4 Star	4 Star	4 Star
Type of Cooling System	Refrigerative ducted	Refrigerative ducted	Refrigerative ducted
Cooling System Efficiency	4 Stars	4 Stars	4 Stars
Type of Hot Water System	I Gas Instantaneous 5 star	I Gas Instantaneous 5 star	I Gas Instantaneous 5 star
% Contribution from solar hot water system	0 %	0 %	0 %
Clothes Line	A No drying facilities	A No drying facilities	A No drying facilities
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer

Non-Residential Spaces Energy Profiles

	Other Buildings	Office Building
Heating, Cooling & Comfort Ventilation - Electricity - baseline kWh	1081375.0	637450.0
Heating, Cooling & Comfort Ventilation - Electricity - proposed kWh	908355.0	535458.0
Hot Water - Gas - baseline MJ	1000.0	1000.0
Hot Water - Gas - proposed MJ	800.0	800.0
Peak Thermal Cooling Load - Baseline kW	779.0	459.0
Peak Thermal Cooling Load - Proposed kW	654.0	386.0

Solar Photovoltaic systems

	Stage 3 - Lot 3, 4, 9, 10	Stage 3 - Lot 8 Office	Stage 3 - L
Name	Stage 3 - Lot 3, 4, 9, 10	Stage 3 - Lot 8 Office	Stage 3 - L
System Size (lesser of inverter and panel capacity) kW peak	60.0	15.0	-
Orientation (which way is the system facing)?	North	North	-
Inclination (angle from horizontal) (degrees) Angle	30.0	30.0	-
Which Building Class does this apply to?	Apartment	Office Building	-

Energy 1.1 Thermal Performance Rating - Non-Residential 12%

Score Contribution	This credit contributes 9.3% towards this section's score.
Aim	Reduce reliance on mechanical systems to achieve thermal comfort in summer and winter - improving comfort, reducing greenhouse gas emissions, energy consumption, and maintenance costs.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2016 BCA Volume 1 Section J)

Calculations

Total Improvement * Percentage %

Office Building	Other building
16 %	16 %

Energy 1.2 Thermal Performance Rating - Residential 50%

Score Contribution	This credit contributes 21.3% towards this section's score.
Aim	Reduce reliance on mechanical systems to achieve thermal comfort in summer and winter - improving comfort, reducing greenhouse gas emissions, energy consumption, and maintenance costs.
Criteria	What is the average NatHERS rating?

Calculations

Average NATHERS Rating (Weighted) * Stars

Apartment
7.4

Energy 2.1 Greenhouse Gas Emissions 100%

Score Contribution	This credit contributes 9.4% towards this section's score.
Aim	Reduce the building's greenhouse gas emissions
Criteria	Are greenhouse gas emissions >10% below the benchmark

Calculations

Reference Building with Reference Services (BCA only) * kg CO_2

Apartment	Office Building	Other building
1323127.3	758616.8	1286887.6

Proposed Building with Proposed Services (Actual Building) * kg CO_2

Apartment	Office Building	Other building
607716.2	637236.1	1080983.5

% Reduction in GHG Emissions * Percentage %

Apartment	Office Building	Other building
54 %	16 %	16 %

Energy 2.3 Electricity Consumption 100%

Score Contribution	This credit contributes 9.4% towards this section's score.
Aim	Reduce consumption of electricity
Criteria	Is the annual electricity consumption >10% below the benchmark

Calculations

Reference * kWh

Apartment	Office Building	Other building
949507.7	637450.0	1081375.0

Proposed * kWh

Apartment	Office Building	Other building
412919.0	535458.0	908355.0

Improvement * Percentage %

Apartment	Office Building	Other building
56 %	16 %	16 %

Energy 2.4 Gas Consumption 100%

Score Contribution	This credit contributes 9.4% towards this section's score.
Aim	Reduce consumption of gas
Criteria	Is the annual gas consumption >10% below the benchmark?

Calculations

Reference * MJ

Apartment	Office Building	Other building
3764137.9	1000.0	1000.0

Proposed * MJ

Apartment	Office Building	Other building

2266560.1	800.0	800.0

Improvement * Percentage %

Apartment	Office Building	Other building
39 %	20 %	20 %

Energy 3.1 Carpark Ventilation 100%

Score Contribution	This credit contributes 9.4% towards this section's score.

Questions

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 *

Project wide
Yes

Energy 3.2 Hot Water 100%

Score Contribution	This credit contributes 4.7% towards this section's score.
Criteria	Does the hot water system use >10% less energy (gas and electricity) than the reference case?

Calculations

Reference * kWh

Apartment	Office Building	Other building
1045593.9	277.8	277.8

Proposed * kWh

Apartment	Office Building	Other building
631267.3	222.2	222.2

Improvement * Percentage %

Apartment	Office Building	Other building
39 %	20 %	20 %

Energy 3.6 Internal Lighting - Residential Multiple Dwellings 100%

Score Contribution	This credit contributes 7.1% towards this section's score.

Aim	Reduce energy consumption associated with internal lighting

Questions

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 BCA (2013) Volume 1 Section J (Class 2 to 9) and clause 3.12.5.5 NCC BCA (2013) Volume 2 Section J (Class 1 and 10) *

Apartment

Yes

Energy 3.7 Internal Lighting - Non-Residential 37%

Score Contribution	This credit contributes 2.3% towards this section's score.
Aim	Reduce energy consumption associated with internal lighting

Questions

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) *

Office Building

Yes

Energy 4.1 Combined Heat and Power (cogeneration / trigeneration) N/A

This credit was scoped out: No reason provided

This credit was disabled: No cogeneration or trigeneration system in use.

Aim	Reduce energy consumption
Criteria	Does the CHP system reduce the class of buildings GHG emissions by more than 25%?

Energy 4.2 Renewable Energy Systems - Solar 75%

Score Contribution	This credit contributes 4.7% towards this section's score.
Aim	To encourage the installation of on-site renewable energy generation
Criteria	Does the solar power system provide 5% of the developments estimated energy consumption?

Calculations

Solar Power - Energy Generation per year * kWh

Apartment	Office Building
78183.0	19545.8

% of Building's Energy * Percentage %

Apartment	Office Building
7 %	3 %

Stormwater

100% - contributing 14% to overall score

Credit	Disabled	Scoped out	Score
Stormwater 1.1 Stormwater Treatment			100 %

Which stormwater modelling are you using? Melbourne Water STORM tool

Stormwater 1.1 Stormwater Treatment

100%

Score Contribution	This credit contributes 100.0% towards this section's score.
Aim	To achieve best practice stormwater quality objectives through reduction of pollutant load (suspended solids, nitrogen and phosphorus)
Criteria	Has best practice stormwater management been demonstrated?

Questions

STORM score achieved *

Project wide
100

Flow (ML/year) * % Reduction

Project wide
21.5

Total Suspended Solids (kg/year) * % Reduction

Project wide
84.7

Total Phosphorus (kg/year) * % Reduction

Project wide
84.1

Total Nitrogen (kg/year) * % Reduction

Project wide

46.3

Calculations

Min STORM Score *

Project wide

100

IEQ

51% - contributing 8% to overall score

Credit	Disabled	Scoped out	Score
IEQ 1.2 Daylight Access - Bedrooms			67 %
IEQ 1.3 Winter Sunlight			100 %
IEQ 1.4 Daylight Access - Non-Residential			12 %
IEQ 1.5 Daylight Access - Minimal Internal Bedrooms			100 %
IEQ 2.1 Effective Natural Ventilation			67 %

Use the BESS Deem to Satisfy (DtS) method for IEQ?	No
Are all living areas and bedrooms less than 8m deep (5m if south facing)?	No
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?	No
What approach do you want to use for IEQ?	Provide our own calculations

IEQ 1.2 Daylight Access - Bedrooms

67%

Score Contribution	This credit contributes 25.0% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light.
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%

Questions

Percentage Achieved ? * Percentage %

Apartment

80 %

IEQ 1.3 Winter Sunlight 100%

Score Contribution	This credit contributes 8.3% towards this section's score.
Aim	To provide a high level of amenity and reduce need for artificial heating in winter.
Criteria	Do 70% of dwellings receive at least 3 hours of direct sunlight in all Living areas between 9am and 3pm in mid-winter?

Questions

Criteria Achieved ? *

Apartment

Yes

IEQ 1.4 Daylight Access - Non-Residential 12%

Score Contribution	This credit contributes 8.2% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light.
Criteria	What % of the nominated floor area has at least 2% daylight factor?

Questions

% Achieved ? *

Office Building

30 %

IEQ 1.5 Daylight Access - Minimal Internal Bedrooms 100%

Score Contribution	This credit contributes 8.3% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light and ventilation.

Questions

Do at least 90% of dwellings have an external window in all bedrooms? *

Apartment

Yes

IEQ 2.1 Effective Natural Ventilation 67%

Score Contribution	This credit contributes 25.0% towards this section's score.
Aim	To provide fresh air and passive cooling opportunities.
Criteria	What % of dwellings are effectively naturally ventilated?

Questions

% Achieved ? *

Apartment
60 %

Transport 57% - contributing 5% to overall score

Credit	Disabled	Scoped out	Score
Transport 1.1 Bicycle Parking - Residential			100 %
Transport 1.2 Bicycle Parking - Residential Visitor			100 %
Transport 2.1 Electric Vehicle Infrastructure			100 %

Transport 1.1 Bicycle Parking - Residential 100%

Score Contribution	This credit contributes 17.2% towards this section's score.
Aim	To encourage and recognise initiatives that facilitate cycling
Criteria	Is there at least one secure bicycle space per dwelling?

Questions

Bicycle Spaces Provided ? *

Apartment
825

Calculations

Min Bicycle Spaces Required *

Apartment
296

Transport 1.2 Bicycle Parking - Residential Visitor 100%

Score Contribution	This credit contributes 17.2% towards this section's score.
Aim	To encourage and recognise initiatives that facilitate cycling
Criteria	Is there at least one visitor bicycle space per 4 dwellings?

Questions

Visitor Bicycle Spaces Provided ? *

Apartment
99

Calculations

Min Visitor Bicycle Spaces Required *

Apartment
74

Transport 2.1 Electric Vehicle Infrastructure 100%

Score Contribution	This credit contributes 22.8% towards this section's score.
Aim	To facilitate the expansion of infrastructure to support electric vehicle charging
Notes	Additional 2 electric charge points provided. at Basement 2 with wayfinding i.e. single pillar along village way (refer to section 1.10.3 in the SMP report).

Questions

Are facilities are provided for the charging of electric vehicles? *

Project wide
Yes

Waste 33% - contributing 2% to overall score

Credit	Disabled	Scoped out	Score
Waste 2.2 - Operational Waste - Convenience of Recycling			100 %

Waste 2.2 - Operational Waste - Convenience of Recycling 100%

Score Contribution	This credit contributes 33.3% towards this section's score.
Aim	To minimise recyclable material going to landfill

Questions

Are the recycling facilities at least as convenient for occupants as facilities for general waste? *

Project wide
Yes

Urban Ecology

21% - contributing 1% to overall score

Credit	Disabled	Scoped out	Score
Urban Ecology 1.1 Communal Spaces			85 %
Urban Ecology 2.1 Vegetation			25 %

Urban Ecology 1.1 Communal Spaces

85%

Score Contribution	This credit contributes 11.4% towards this section's score.
Aim	To encourage and recognise initiatives that facilitate interaction between building occupants
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

Questions

Common space provided * Square Metres

Apartment	**Office Building**
940.0	225.0

Calculations

Minimum Common Space Required * Square Metres

Apartment	**Office Building**	**Other building**
275	126	133

Urban Ecology 2.1 Vegetation

25%

Score Contribution	This credit contributes 45.7% towards this section's score.
Aim	To encourage and recognise the use of vegetation and landscaping within and around developments
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area.

Questions

Percentage Achieved ? * Percentage %

Project wide
5 %

Innovation

0% - contributing 0% to overall score

Innovations

	Innovation #1
Name	Innovation #1

Items to be marked on floorplans

0 / 18 floorplans & elevation notes complete.

Management 3.1: Individual utility meters annotated	Incomplete
Management 3.2: Individual utility meters annotated	Incomplete
Management 3.3: Common area submeters annotated	Incomplete
Water 2.1: Location of rainwater tanks as described	Incomplete
Water 3.1: Water efficient garden annotated	Incomplete
Energy 3.1: Carpark with natural ventilation or CO monitoring system	Incomplete
Energy 4.2: Floor plans showing location of photovoltaic panels as described.	Incomplete
Stormwater 1.1: Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)	Incomplete

IEQ 1.2: If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	Incomplete
IEQ 1.3: If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	Incomplete
IEQ 1.5: Floor plans with compliant bedrooms marked	Incomplete
IEQ 2.1: Dwellings meeting the requirements for being 'naturally ventilated'	Incomplete
Transport 1.1: All nominated residential bicycle parking spaces	Incomplete
Transport 1.2: All nominated residential visitor bicycle parking spaces	Incomplete
Transport 2.1: Location of electric vehicle charging infrastructure	Incomplete
Waste 2.2: Location of recycling facilities	Incomplete
Urban Ecology 1.1: Size and location of communal spaces	Incomplete
Urban Ecology 2.1: Vegetated areas	Incomplete

Documents and evidence

0 / 13 supporting evidence documentation complete.

Management 2.2: Preliminary NatHERS assessments	Incomplete
Management 2.3: Preliminary modelling report	Incomplete
Energy 1.1: Energy Report showing calculations of reference case and proposed buildings	Incomplete
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.	Incomplete
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.	Incomplete
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.	Incomplete
Energy 4.2: Specifications of the solar photovoltaic system(s).	Incomplete
Stormwater 1.1: STORM report or MUSIC model	Incomplete
IEQ 1.2: If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	Incomplete
IEQ 1.3: If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	Incomplete
IEQ 1.4: A short report detailing assumptions used and results achieved.	Incomplete
IEQ 1.5: A list of compliant bedrooms	Incomplete
IEQ 2.1: A list of naturally ventilated dwellings	Incomplete

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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Appendix C – Development Schedule

Project	Proposed Mixed Development
Address	127-139 Nicholson St and 149 Nicholson Street, Brunswick VIC
Client	East Brunswick Village Pty Ltd
Stage	**1,2 and 3** Rev T 19/06/2020

SUMMARY SITE	Stages 1,2 & 3		
Site Area (approx.)	29480.0 m2		
Site Coverage (building area at ground)	16450.6 m2	55.80%	
Site Coverage (non-permeable, inc. basement)	27166.9 m2	92.15%	
Total gross building area basements	49977.5 m2		
Total gross building area above ground (excluding voids, excluding balconies)	21423.6 m2		
Total Number of Carspaces - residential	791		
Total Number of Carspaces - retail	286		
Total Number of Carspaces - medical (lot3)	27		
Total Number of Carspaces - gym (lot3)	21		
Total Number of Carspaces - offices	63		
Total Number of Stores	821		
Total Number of Residential Bicycle Spaces	825		
Total Number of Residential Visitor Bicycle Spaces	99		
Total Number of Retail Visitor Bicycle Spaces	30		
Total Number of Retail Staff Bicycle Spaces	13		
Retail Area Lot 2 (Supermarket)	2375.2 m2	not including BOH	(BOH 583.3 m2)
Retail Area Lot 1 (Specialty)	876.1 m2		
Retail Area Lot 3 (Specialty)	1051.5 m2		
Retail Area Lot 4 (Specialty)	1374.0 m2		
Retail Area Lot 6 (Café)	190.5 m2		
Total Retail Area	**5867.3 m2**		
Total Medical Suites Area	598.0 m2		
Cinemas Lot 4	954.0 m2	cinemas 1-6 only (405 seats)	
Gym/ Yoga studio area Lot 3	946.0 m2		
Office Area Lot 8	2549.8 m2	not inc. home offices	
Total Residential Area	50670.2 m2	not inc. balconies or terraces	
Total 1 bed units	235 units		
Total 1 bed + study units	82 units		
Total 1 bed + home office units	3 units		
Total 2 bed units	355 units		
Total 2 bed + study units	11 units		
Total 3 bed units	69 units		
Total Units	**755 units**		

SUMMARY APARTMENTS	Ground floor	1st floor	2nd floor	3rd floor	4th floor	5th floor	Total
Lot 1							
1 bed		3	3	5	10		21
1 bed + study		4	4	7	2		17
2 bed		9	9	4	4		26
							64
Lot 2							
1 bed		15	16	14	13	13	71
1 bed + study		6	5	1	1	1	14
2 bed		11	10	11	11	9	52
3 bed		2	3	3	3	3	14
							151
Lot 3							
1 bed + study			5	1	1		7
2 bed			6	3	3		12
2 bed + study			3	3	3		9
3 bed			4	7	7		18
							46
Lot 4							
1 bed		5	9	9	9	9	41
1 bed + study		4	4	4	4	4	20
2 bed		11	11	11	11	11	55
2 bed + study		2					2
3 bed		6	6	6	6	6	30
							148
Lot 5							
1 bed	9	8	8	7	6	5	43
2 bed	15	17	15	16	13	6	82
							125
Lot 6							
1 bed	2	4	4	4	4	5	23
1 bed + home office	3						3
2 bed	1	5	5	5	5	4	25
							51
Lot 7							
1 bed	5	4	4	4			17
2 bed	8	11	11	11	8		49
3 bed					2		2
							68
Lot 9							
1 bed	3	4	4	4	4		19
1 bed + study	3	3	3	3	3		15
2 bed	4	5	5	5	5		24
							58
Lot 10							
1 bed + study	2	1	2	1	1	2	9
2 bed	4	5	6	6	6	3	30
3 bed	1	1	1	1	1		5
							44
TOTAL	60	146	166	156	146	81	**755**

Appendix D – Water Sensitive Urban Design Report

Stormwater Collection Areas

This section provides the rainwater collection area mark-ups used for STORM calculations. The collection areas are composed by:

Figure 7: Landscaping Diagram

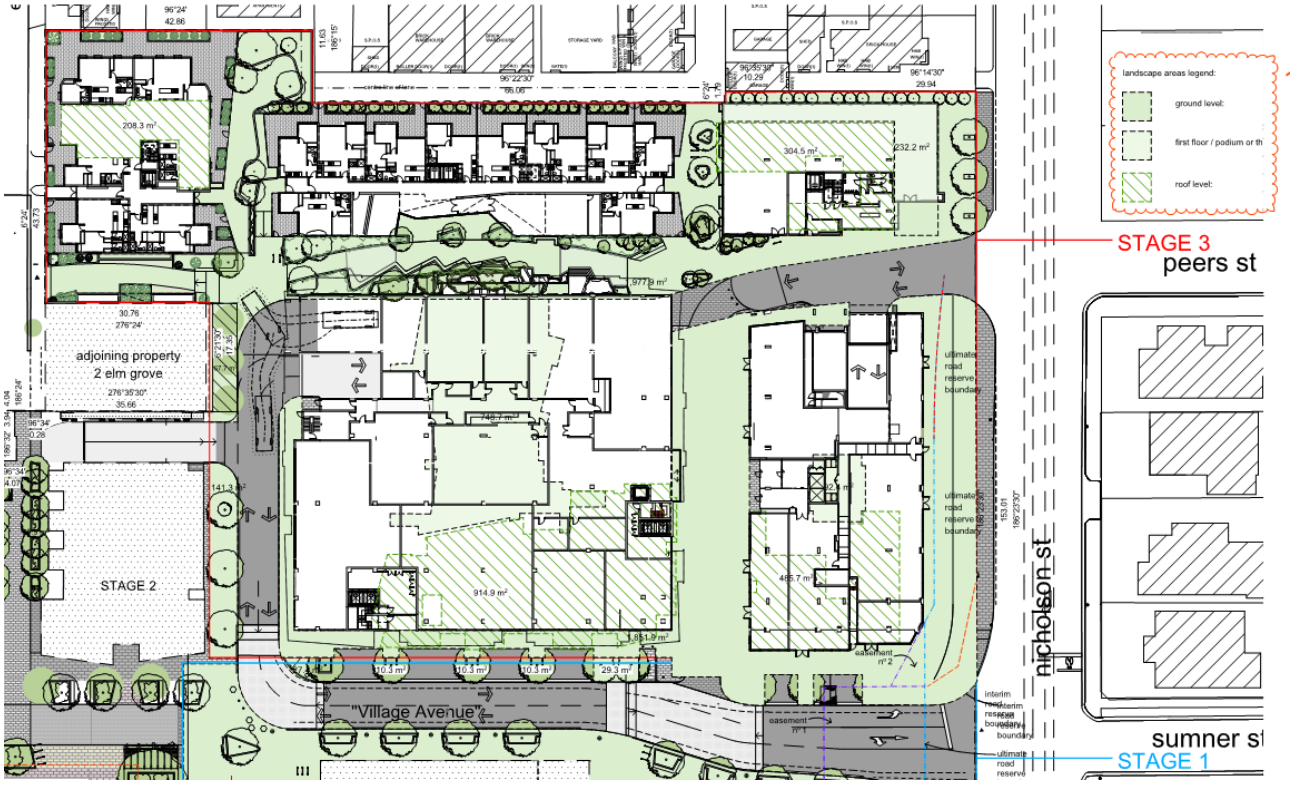
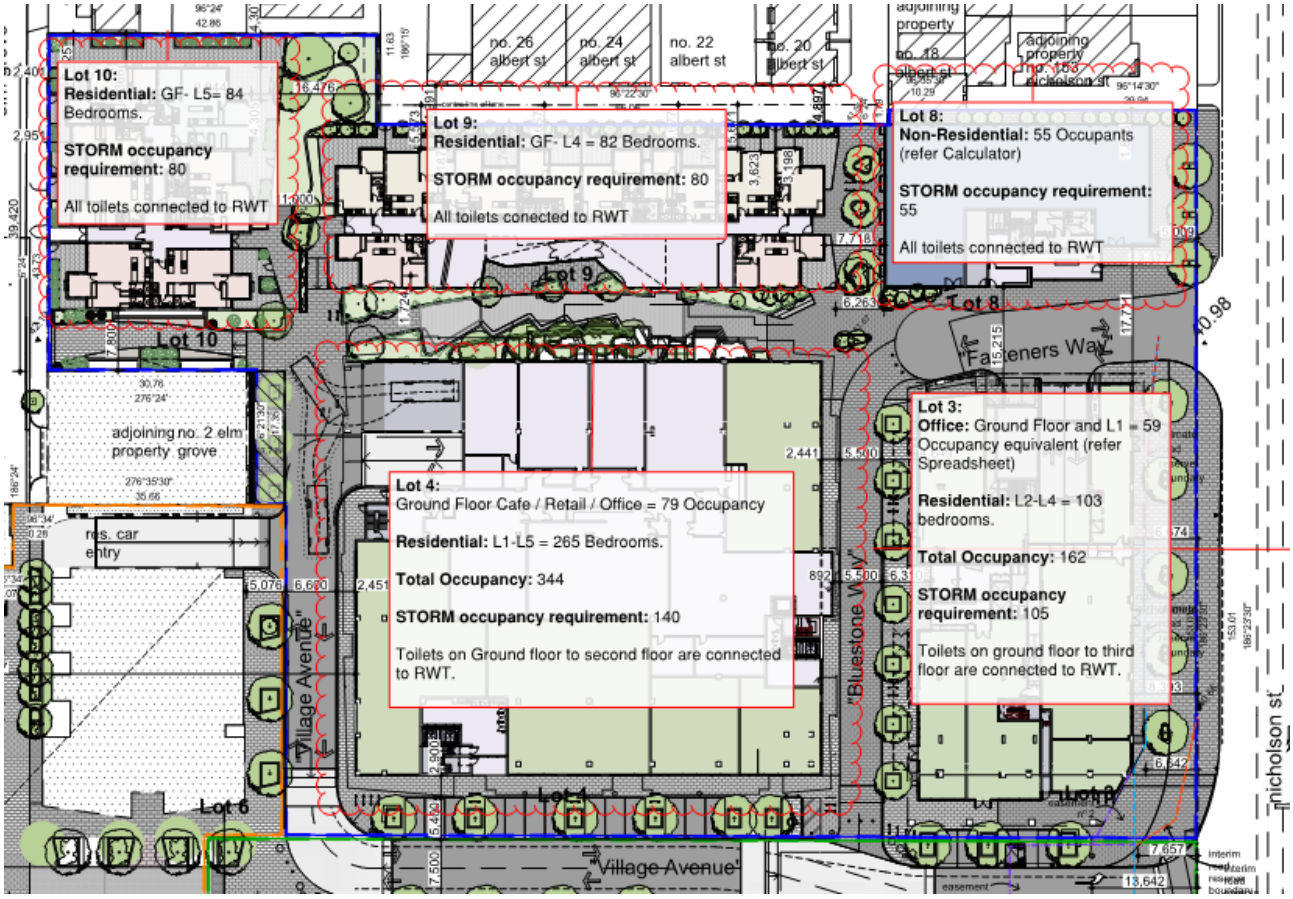


Figure 8: Toilet connection to RWT



Lot 3:
Toilets on ground floor to third floor are connected to RWT.
Non-Residential: Ground Floor = 11 Occupants , First Floor = 47 Occupants
Residential: L3-L3 = 64 Bedrooms
Total: 122 Occupants

Lot 4:
Toilets on ground floor to second floor are connected to RWT.
Non-Residential: Ground Floor = 79 Occupants
Residential: L1-L2 = 104 Bedrooms
Total: 183 Occupants

Lot 8:
All toilets are connected to RWT.
Non-Residential (Total): 55 Occupants

Lot 9:
All toilets are connected to RWT.
Residential (Total): GF-L4 = 82 Bedrooms/Occupants

Lot 10:
All toilets are connected to RWT.
Residential (Total): GF-L5 = 84 Bedrooms/Occupants

STORM Report

The development achieves a STORM rating of 100% as shown below.

Melbourne Water

STORM Rating Report

TransactionID:	833234
Municipality:	MORELAND
Rainfall Station:	MORELAND
Address:	127-139 Nicholson Street Stage 3 East Brunswick VIC 3057
Assessor:	ADP
Development Type:	Residential - Mixed Use
Allotment Site (m2):	13,702.00
STORM Rating %:	100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Lot 3- Roof (A)	559.00	Rainwater Tank	25,000.00	45	170.00	82.00
Lot 3- Roof (B)	558.00	Rainwater Tank	25,000.00	45	170.00	82.00
Lot 3- Trafficable Roof/terraces	358.00	Rainwater Tank	25,000.00	20	170.00	82.00
Lot 3- Untreated Hard Surfaces	1,396.00	None	0.00	0	0.00	0.00
Lot 4- Roof (A)	905.00	Rainwater Tank	25,000.00	50	164.00	82.00
Lot 4- Roof (B)	905.00	Rainwater Tank	25,000.00	50	164.00	82.00
Lot 4- Trafficable Roof/terraces (A)	540.00	Rainwater Tank	25,000.00	45	170.00	82.00
Lot 4- Trafficable Roof/terraces (B)	540.00	Rainwater Tank	25,000.00	45	170.00	82.00
Lot 4- Untreated Hard Surfaces	1,721.00	None	0.00	0	0.00	0.00
Lot 8- Trafficable Roof/terraces	394.00	Rainwater Tank	15,000.00	30	170.00	82.00
Lot 8- Untreated Hard Surfaces	543.00	None	0.00	0	0.00	0.00

Date Generated: 10-Sep-2019 Program Version: 1.0.0

STORM Rating Report

TransactionID:	833234
Municipality:	MORELAND
Rainfall Station:	MORELAND
Address:	127-139 Nicholson Street Stage 3 East Brunswick VIC 3057
Assessor:	ADP
Development Type:	Residential - Mixed Use
Allotment Site (m2):	13,702.00
STORM Rating %:	100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Lot 8- Roof	298.00	Rainwater Tank	15,000.00	30	170.00	82.00
Lot 9- Roof (A)	532.00	Rainwater Tank	20,000.00	45	170.00	82.00
Lot 9- Roof (B)	532.00	Rainwater Tank	20,000.00	40	170.00	82.00
Lot 9- Untreated Hard Surfaces	640.00	None	0.00	0	0.00	0.00
Lot 10- Roof	589.00	Rainwater Tank	20,000.00	45	170.00	82.00
Lot 10- Trafficable Roof/terraces	239.00	Rainwater Tank	10,000.00	45	170.00	82.00
Lot 10- Untreated Hard Surfaces	492.00	None	0.00	0	0.00	0.00

Date Generated: 10-Sep-2019 Program Version: 1.0.0

Rainwater Tank Maintenance Manual

Tips for undertaking maintenance

Things to look for and how to fix them.

Leaf litter / debris in gutters	**Pump not working**
Regularly clear your gutters. Make sure you cover the tank inlet if you're rinsing down the gutters to avoid debris entering the tank.	Check operating instructions for your pump. Check that pumps are kept clear of surface water (flooding), vegetation, and have adequate ventilation. Pumps should be serviced every few years to prolong the pump life.
Blocked downpipe	**Mains backup or pump not working**
If you see water spilling from the edge of the gutters check that the downpipe is not blocked, removing any debris.	Have you heard the pump operating? If the mains backup switching device fails many people do not notice for a long time. Consider a manual system if the switching device is problematic and you don't mind operating it manually.
First flush diverter clogging	**Overflow**
To clean out, unscrew the cap at the base of the diverter and remove the filter. Wash the filter with clean water and the flow restrictor inside the cap.	Check that the overflow is not blocked and that there is a clear path for water to safely spill from the tank through the overflow pipe when full. Check that a clean mesh screen is safely in place to prevent mosquitoes entering the tank.
Debris on the mesh cover over inlets / outlets	**Sediment / debris build-up in tank (more than 20mm thick)**
The fine stainless steel mesh is similar to fly screen mesh. It should be cleaned regularly to ensure it does not become blocked with leaves and other material.	Over time a small amount of fine sediment will collect in the bottom of your tank and this is harmless and natural. It should not be disturbed until it is approx 20 mm thick which may take many years. To clean your tank out simply empty your tank and wash out with a high-pressure washer or hose.
Dirt and debris around the tank base or side.	**Base area**
Keep leaf build-up, sticks, pot plants and other items off the lid of your tank. Use a hose to remove dust and dirt from the outside of the rainwater tank and ensure there is no debris on the base, bottom lip and walls of your tank.	Tanks must be fully supported by a flat and level base. Check for any movement, cracks or damage to the slab or pavers. If damage is observed, empty the tank to remove the weight and have the fault corrected to prevent damage to the tank. There is no warranty from suppliers for damage to a rainwater tank if the base has failed.
Smelly water or mosquitos	**Monitoring the water level**
Rainwater tanks can smell if there is debris in the gutters. Check the gutters and leaf strainers are clean. Mosquitos or wrigglers can make their way into your tank if they are small enough to pass through the inlet strainer. A very small amount of chlorine (approx 4 parts per million) can be put in the tank to kill off mosquitos or the bacteria causing odours. The chlorine will disinfect the water and then evaporate. Chlorine tablets from a pool supplier can be used (but check the recommended dose based on your tank capacity).	A range of devices are available to monitor water level. Some simple float systems can be used effectively.

Acknowledgement: Information from PJT Green Plumbing's 'Maintenance Guide for Your Rainwater Tank' was used to develop this fact sheet.

Maintenance manual

Rainwater tanks

Site address: East Brunswick Village – Stage 3
127-139 & 149 Nicholson Street, VIC 3057

Planning permit number: TBC

Rainwater tank maintenance

This manual lists the key tasks required to maintain a domestic rainwater tank and the recommended frequency of each task. This manual can be submitted with planning permit applications for developments that include the installation of a domestic rainwater tank. Once endorsed, the property owner is responsible for continuous implementation of rainwater tank maintenance, in accordance with the guidance in this manual.

Rainwater tanks are an exceptional tool for environmental protection. They collect and store roofwater for use inside and outside the home. This simultaneously reduces the demand on our precious potable mains water and limits the amount of stormwater pollutants that enter our sensitive Bay.

Maintenance of rainwater tanks is relatively easy however it is important to do the following key tasks to ensure the quality of water is high:

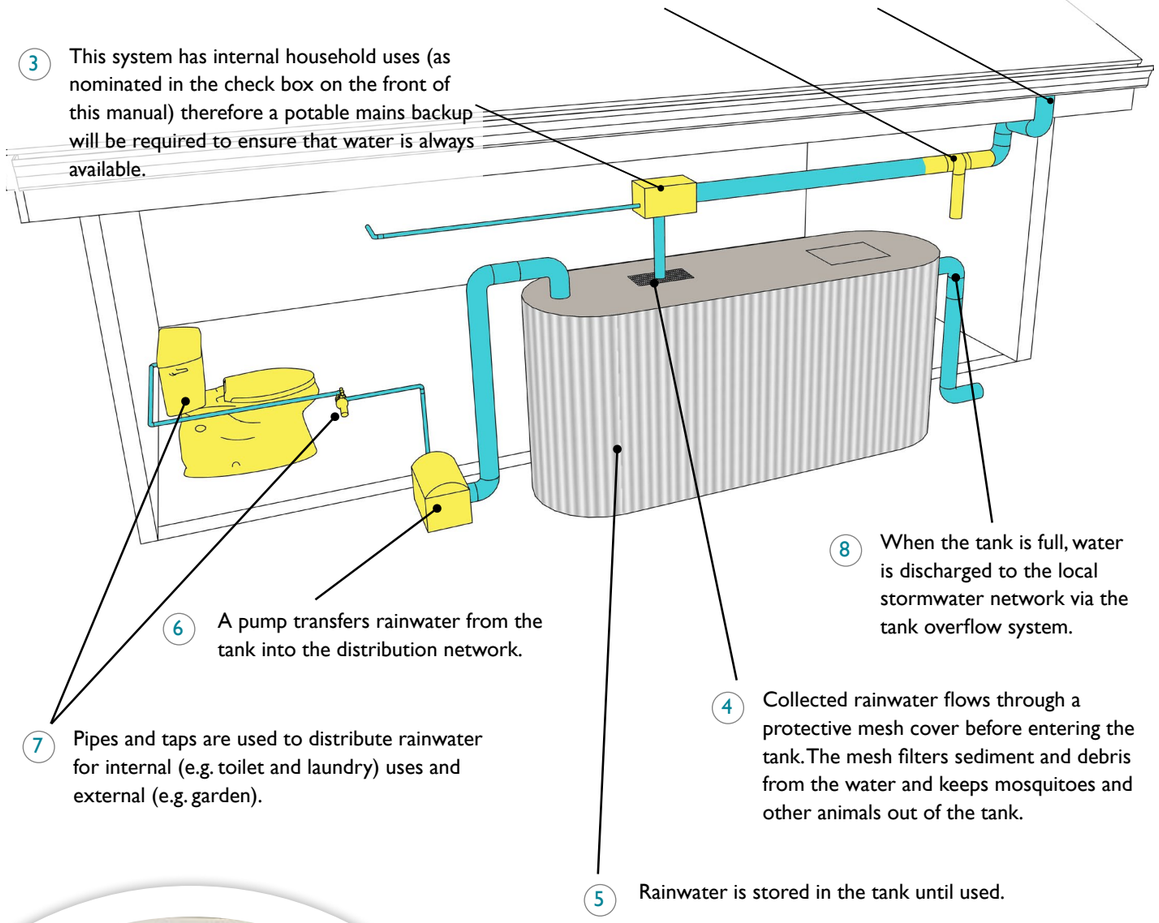
- stop leaf litter and debris entering the tank.
- prevent bird droppings and dust building up in the gutters.
- prevent mosquitos and other animals entering the tank.

Tank connected to	toilet only ☒ toilet & irrigation ☐ toilet & laundry & irrigation ☐ toilet & laundry & hot water & irrigation ☐
Rainwater tank location	Refer to Architectural Drawings
Planning drawing number showing rainwater tank location	TBC
Rainwater tank construction date	TBC
Date of final building inspection	TBC
Tank volume (litres)	Refer to Section 1.8- Storm-water Management
Area or percentage of the roof that is connected to the tank via gutters and downpipes	Refer to Section 1.8- Storm-water Management

Maintenance Overview

Rainwater Tank Maintenance

The following diagram identifies the key items which are important for rainwater tanks and their maintenance.



Maintenance Checklist

The property owner is responsible for checking the maintenance items in this checklist at the recommended frequency at the bottom of the table. The maintenance log at the bottom of the page should be filled in once each maintenance check is complete. Upkeep of this maintenance log should continue throughout the life of the rainwater tank.

Item	Rainwater tank element	Inspection item	Y/N	Likely maintenance task
1	Roof gutters and downpipes	Is there leaf litter or debris in the gutters?		Remove by hand and dispose responsibly.
2	First flush diverter	Is there anything blocking the first flush diverter (leaves etc)?		Remove by hand and dispose responsibly.
3	Potable mains back up device	Is the potable mains back up switch operating correctly?		Repair or replace device. Consider a manual switching device.
4	Mesh cover	Has the mesh cover deteroriated or have any holes in it?		Replace mesh cover.
5	Tank volume	Is there large amounts of sediment or debris sitting in the bottom of the tank, reducing the volume available in the tank to store water?		Remove sediment and dispose responsibly.
6	Pump	Is the pump working effectively? Have you heard it on a regular basis?		Check the potable mains back up is not permanently on. Repair or replace pump.
7	Pipes and taps	Are pipes and taps leaking?		Repair as needed.
8	Overflow	Is the overflow clear and connected to the stormwater network?		Remove blockages and/or restore connections to stormwater network.
9	Supporting base	Are there any cracks or movement of pavers?		Empty the tank to reduce weight then repair any damage to the base.

Maintenance frequency

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All tasks	x			x			x			x		

Regular maintenance will improve the water quality and extend the life of your system. A well maintained tank isn't likely to need to be cleaned out for up to ten years (when there is more than 20mm of accumulated sediment).

Maintenance Log

Maintenance date	Maintenance undertaken

ACOUSTIC PLANNING REPORT

Lots 3 and 4 East Brunswick Village
Proposed Cinema Complex and Gym

Prepared for:

BC (EBV) Pty Ltd.
PO Box 1144
CARLTON VIC 3053

SLR Ref: 640.10205-R07
Version No: -v0.2
June 2020

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with BC (EBV) Pty Ltd. (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
640.10205-R07-v0.2	26 June 2020	Dianne Williams	Jim Antonopoulos	Dianne Williams
640.10205-R07-v0.1	6 May 2020	Dianne Williams	Jim Antonopoulos	

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APPENDIX A: Marked up plan of cinemas

1 Introduction

SLR Consulting Australia has been retained by BC (EBV) Pty Ltd to provide acoustic planning advice for addressing noise and vibration impacts from the proposed changes to Lots 3 and 4 of East Brunswick Village (EBV).

The current architectural drawings for the project include a gym on first floor of Lot 3 and a cinema complex on the ground level of Lot 4. Details of the drawings are provided in **Table 1**.

Table 1 Referenced Drawings

Architect	Building	Revision and Date	Acoustically significant change
Jam Architects Pty Ltd	Lot 3	TP51, June 2020	Gym on first floor
Jam Architects Pty Ltd	Lot 4	TP17, June 2020	Cinema complex on gnd level

The following town planning report identifies the acoustic risks associated with the proposed changes; appropriate design targets for noise, and provides preliminary advice for achieving compliance.

2 Lot 3 Gym

2.1 Proposal, potential noise impacts and noise sensitive receivers

A 946 m² gym and yoga studio is proposed for Lot 3. The gym is proposed to include standard cardio, free weight and weight machine areas. Group classes may be held.

Potentially impacted noise sensitive receivers include:

- Residential apartments on the second floor of the same building
- Commercial spaces on the same floor as the gym
- Retail outlets on the ground floor
- Existing apartments in Lot 2 of EBV
- Proposed apartments in Lot 6 of EBV

Potential noise and vibration impacts from use of the gym include music, instructor voice noise, and structureborne noise and vibration generated by use of running machines, patrons jumping, and the dropping of weights.

Music levels can vary considerably in gyms. For the purpose of this assessment it has been assumed that music will be played at 'moderate-level', and that octave band levels will not exceed the levels presented in **Table 2.**

Table 2 Assumed Maximum Gym Music Levels

Octave band music level, dB L_{10}							Overall level
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dBA Leq
87	87	87	82	82	77	77	85

The advice provided in **Section 2.3** should be upgraded if higher levels of music are sought. Similarly, the proposed acoustic ratings of partitions may be able to be reduced if the gym operator is satisfied with lower levels of music.

2.2 Noise Criteria

Potential noise impacts from the use and the relevant assessment criteria are detailed in **Table 3**.

Table 3 Noise criteria and targets

Noise source	Noise Criteria and targets for receiver locations		
	Apartments above	Other Apartments	Commercial receivers
Gym classes, running machines, weights dropped, impacts to walls etc from gym equipment	SEPP N-1 adjusted for indoor receiver location	SEPP N-1 limits, to be met externally	AS/NZS 2107:2016 for proposed use. Lower end of range to be targeted for steady state noise.
	Sleep disturbance targets to be met inside apartments, windows closed: • 45 dBA Lmax (worst case impacts) • <40 dBA Lmax (regularly occurring events)	Sleep disturbance targets to be met outside bedroom windows: • 65 dBA Lmax	AS/NZS 2107:2016 for proposed use. Upper end of range to be targeted for instantaneous Lmax noise.
Music	SEPP N-2 base noise limits	SEPP N-2 background based limits	AS/NZS 2107:2016 for proposed use. Lower end of range to be targeted for steady state noise.

2.3 Preliminary advice for noise control

2.3.1 Floor

The primary source of noise from gym activities is via physical impacts to the floor, including group exercise classes, dropping of weights and use of running machines.

The floor below active areas of the gym should comprise a 25 mm static deflection damped spring floating floor system, such as the Embelton NXS-14, with the following approximate configuration (described from top down):

- Minimum 15 mm thick rubber gym tile
- 2 layers 25 mm thick plywood
- Damped (spring and rubber) isolation mounts with a static deflection of approximately 25 mm (mounts typically 80-100 mm high)
- Base building structure to be designed to support load

The isolated floor must not be in rigid connection to the columns, façade, walls or any structure that is itself rigidly connected to the base building.

The detailed design of the floor is to be developed with input from a vibration isolation specialist (e.g. Embelton, Engineering Dynamics etc.).

2.3.2 Sauna

The sauna, associated pumps and pipework is to either be independently vibration isolated from the building structure.

2.3.3 Glazing

In the absence of specific glazing upgrades to control noise form the gym to existing and proposed apartments, the façade glazing is assumed to be 6.38 mm thick laminated glass or a double glazed unit comprising 6 mm glass, 12 mm air cavity, 6 mm glass.

Moderate level music commensurate with the levels presented in **Table 2** will comply with all relevant noise limits with the assumed glazing provided that windows of the gym are kept closed.

If louder music is proposed to be played by the gym operator, glazing upgrade treatments should be implemented. Appropriate upgrades should take into consideration the level of music and the times that it is proposed to be played.

2.3.4 Inter-tenancy wall

The gym should be separated from other tenancies on the same level by a wall with an acoustic rating not less than R_w+C_{tr} = 60 dB. Suitable constructions include:

- 3 x 13 mm thick fire rated plasterboard
- Two rows of timber or steel studs separated by 20 mm airgap (overall gap between plasterboard leaves not less than 210 mm)
- 2 rows of 100 mm thick, minimum 14 kg/m³ fibrous insulation between studs
- 2 x 13 mm thick fire rated plasterboard

The wall is to seal to the soffit.

2.3.5 Ceiling

The gym ceiling below apartments is to have an acoustic rating not less than R_w+C_{tr} = 65 dB. Suitable constructions include:

- Minimum 200 mm thick slab

- Minimum 200 mm airgap between slab above and plasterboard ceiling
- 100 mm thick, not less than 14 kg/m³ fibrous insulation
- 2 x 13 mm thick fire rated plasterboard on resilient hangers

Air conditioning equipment and ductwork should be installed below the plasterboard ceiling. A secondary acoustic tile ceiling can be installed below the air conditioning equipment if required.

2.3.6 Equipment

Active gym equipment, such as punching bags, pulleys, weights etc. is not to be fixed to:

- The façade wall
- The intertenancy wall
- The plasterboard ceiling
- Columns

Any such equipment should be mounted on structures fully supported off the isolated floor.

3 Lot 4 Cinemas

3.1 Proposal, potential noise impacts and noise sensitive receivers

Six small to medium cinemas are proposed for the ground floor of Lot 4 EBV. The cinemas will accommodate between 35 and 115 patrons each, and approximately 405 in total.

High levels of noise from music and sound effects can be expected in the cinemas.

Potentially impacted noise sensitive receivers include:

- Residential apartments on the first floor of the same building. Cinemas 2, 3 and 6 are directly below apartments.
- Café and retail spaces on the same floor as the cinemas
- Existing and proposed apartments in Lot 9 of EBV

While not a Council planning consideration, cinemas are also acoustically sensitive spaces. Due to the large dynamic range of sound within cinemas, the spaces need to be designed to effectively control sound transmission between adjacent cinemas and noise ingress from environmental sources, such as loading bays, roads and the like.

For the purpose of this assessment, the cinema sound levels documented in **Table 2** have been assumed.

These levels are typically reached by sound effects in action style films. Some cinemas impose restrictions on the upper level of noise produced for both patron comfort and to minimise noise transfer between cinemas. However, the instantaneous maximum levels are still typically above 98 dBA.

Table 4 Assumed Maximum Cinema Sound Levels

Octave band cinema level, dBC Lmax							Overall level
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dBA Lmax
108	103	98	95	95	95	95	102

3.2 Noise Criteria

Potential noise impacts from the use and the relevant assessment criteria are detailed in **Table 3**.

Table 5 Noise criteria and targets

Noise source	Noise Criteria and targets for receiver locations		
	Apartments above	Apartments in other Lots	Commercial receivers
Sound track	SEPP N-2 base noise limits	SEPP N-2 octave band noise limits (based on externally measured background noise levels	AS/NZS 2107:2016 for proposed use. Lower end of range to be targeted for steady state noise.
	Sleep disturbance targets to be met inside apartments, windows closed: • 45 dBA Lmax (worst case / infrequent impacts) • <40 dBA Lmax (regularly occurring events)	Sleep disturbance targets to be met outside bedroom windows: • 65 dBA Lmax	AS/NZS 2107:2016 for proposed use. Upper end of range to be targeted for instantaneous Lmax noise.

3.3 Electro-acoustic treatments

In order for the design criteria to be met it will be important to have control over both the level of noise produced within the cinemas, and the level of ambient noise within the apartments.

Cinema level controls

Noise levels in the cinemas should not exceed the octave band L_{max} levels provided in **Table 4**. A noise limiter / compressor should be installed in the audio chain of each cinema to prevent excessive levels from occurring.

Apartment level controls

Even very low levels of cinema noise in apartments will cause nuisance to occupants if it is audible. The audibility of sound is dependent on its level relative to the ambient or 'background' noise, and the background noise level in some apartments, particularly those facing an internal courtyard, is likely to be very low.

While designing to the mandatory SEPP N-2 base noise limits is required as a minimum, it may be useful to also consider provision of masking noise within apartments to minimise the risk of nuisance, particularly if high levels of sound are sought by the cinema operator. If dedicated noise masking systems are to be considered, these should be installed in apartments above the cinemas.

Masking noise should meet the following parameters:

- No less than NR15, measured as an L_{90} level (approximately 28 dBA), and
- No greater than NR20, measured as an L_{eq} level (approximately 33 dBA)

3.4 Preliminary architectural advice for noise control

The key architectural means for controlling noise from cinema to sensitive areas are summarised below:

- **Structural Separation** – The cinema space must be vibration isolated from the base building. This can be achieved by constructing an isolated / 'floating' floor and by ensuring that all wall and ceiling linings are not rigidly connected to the base building.
- **Airborne noise control** - high rated acoustic walls and ceilings to prevent the transmission of airborne sound from inside the cinema to apartments and to adjacent cinemas
- **Acoustically treated air conditioning / ventilation** – noise from inside the cinema can be transmitted along air conditioning supply and return ducts and break into sensitive spaces. To minimise noise leakage via these paths all penetrations in the cinema for ventilation must include acoustic silencers or alternative noise control treatments.

Refer to **Appendix A** for a marked up plan of the cinemas.

3.4.1 Isolated Floor

An isolated floor is recommended to keep noise from the cinema out of the building structure. The floor is likely to comprise (described from top down):

- Minimum 3 x 16 mm thick fibre cement (e.g. James Hardie Linea)
- Damped (spring and rubber) isolation mounts with a static deflection of approximately 25 mm (mounts typically 80-100 mm high)
- Minimum 150 mm space between structural floor and isolated floor
- Minimum 100 mm thick fibrous insulation not less than 24 kg/m³
- Structural floor slab designed to support load

It is assumed that the floor cavity will be increased in the raised seating areas (i.e. that the isolated floor will also function as the raised seating platform). In areas where the floor cavity is increased to 500 mm or more, the flooring material may be able to be reduced in thickness (acoustical consultant to review during detailed design).

Each cinema isolated floor is to terminate at the perimeter of the cinema (i.e. 6 separate floors in total).

3.4.2 Cinema Walls

The following wall types are proposed to be used in the cinemas. Note, each 'Type' is effectively half a wall (i.e. one side of a twin stud wall). Details may change during the detailed design phase of the project, as material and product options are investigated.

WALL TYPE A (RES)

- 4 layers of 16 mm thick fire rated plasterboard
- Furring channels
- High deflection isolation mounts
- 'C' studs or similar
- 100 mm thick, 24 kg/m³ fibrous insulation to the wall cavity.

WALL TYPE A

- 4 layers of 16 mm thick fire rated plasterboard
- 'C' studs or similar
- 100 mm thick, 24 kg/m³ fibrous insulation to the wall cavity.

WALL TYPE B

- 3 layers of 13 mm thick fire rated plasterboard
- 'C' studs or similar
- 100 mm thick, 24 kg/m³ fibrous insulation to the wall cavity.

WALL TYPE C

- 2 layers of 13 mm thick fire rated plasterboard
- 'C' studs or similar
- 100 mm thick, 24 kg/m³ fibrous insulation to the wall cavity.

WALL TYPE D

- 1 layer of 13 mm thick plasterboard
- Studs
- 50 mm thick, 24 kg/m³ fibrous insulation to the wall cavity.

Cinema internal walls

It is assumed that the internal walls of each cinema will be constructed on the structural floor and all cinema wall linings will be resiliently mounted from the wall studs.

- Wall Type A (RES) with resiliently mounted wall linings in one cinema
- Wall Type A (RES), with resiliently mounted wall linings in the adjacent cinema

The overall footprint of the walls: ≥ 500 mm.

Cinema external / façade walls should typically consist of:

- Wall Type A (RES), supported off the structural floor with resiliently mounted wall linings, and
- An external masonry wall, or heavy lightweight wall (e.g.Wall type A), without resiliently mounted linings

The overall footprint of the walls: ≥ 500 mm.

Cinema inter-tenancy walls should comprise:

- Wall Type A (RES) to cinema side, and
- Wall Type A to adjacent tenancy side

The overall footprint of the walls: ≥ 500 mm for cafes and open plan retail.

≥ 650 mm for offices

Cinema walls to foyer should comprise:

- Wall Type A (RES) to cinema
- Wall Type B, to foyer side

The overall footprint of the walls: ≥ 400 mm.

Cinema walls to amenities should comprise:

- Wall Type A (RES) to cinema, and
- Wall Type C to amenities

The overall footprint of the walls: ≥ 350 mm.

Refer to the attached marked up drawing showing locations of walls.

3.4.3 Cinema Ceilings

The following cinema ceilings are proposed. They systems take into consideration the proposed slab thicknesses.

CEILING TYPE A

- Concrete
  - 600 mm thick below apartments
  - 300 mm thick below outdoor communal space
- Minimum 200 mm gap between ceiling and soffit

- Minimum 8 mm deflection isolation mounts
- Minimum 150 mm thick, 24 kg/m² fibrous insulation laid over
- 4 x 16 mm thick fire rated plasterboard

CEILING TYPE B

- 300 mm to 600 mm concrete
- Minimum 200 mm gap between ceiling and soffit
- Minimum 8 mm deflection isolation mounts
- Minimum 150 mm thick, 24 kg/m² fibrous insulation laid over
- 3 x 16 mm thick fire rated plasterboard

Note: All cinema ceilings are to be resiliently suspended from soffit with high deflection vibration isolation mounts

3.4.4 Ventilation / Air Conditioning

The silencing requirements for ventilation pathways will vary depending on where the ventilation ductwork is located.

It is recommended that cinema ductwork be located below the acoustic ceilings, and incorporate acoustic attenuators to control crosstalk noise from the cinemas to sensitive spaces. Details of attenuators will be developed during the detailed design phase of the project. However the acoustic treatments for addressing crosstalk noise from the cinemas are likely to be substantial, and it will be imperative that sufficient space is allocated for them.

3.4.5 Loudspeaker Isolation

Loudspeakers should not be rigidly connected to the acoustically rated cinema internal walls. Similarly, the subwoofer should be isolated from the cinema floor.

4 Summary

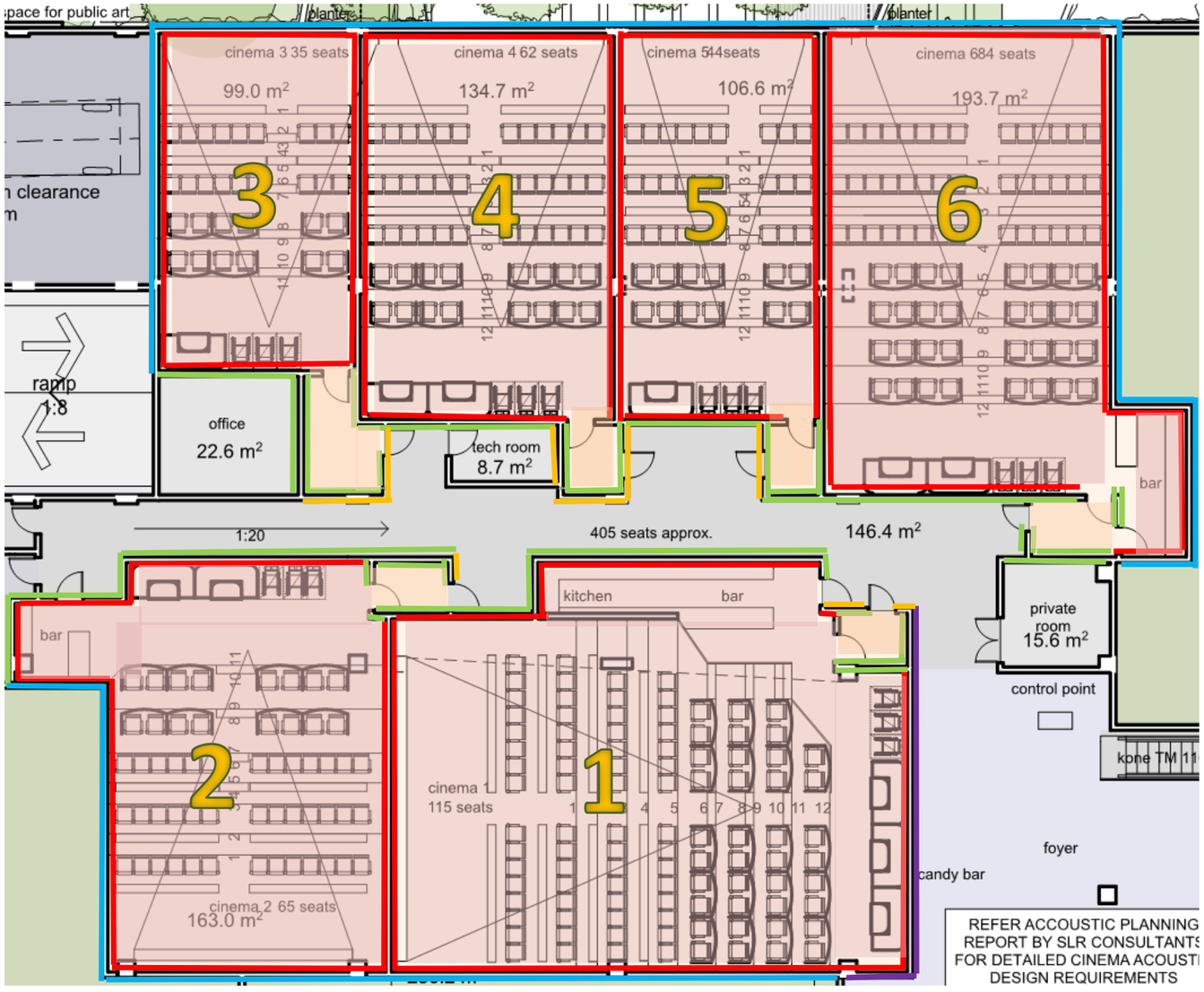
SLR has reviewed the June 2020 drawings for Lots 3 and 4 of EBV, which includes a first floor gym and a cinema complex. Potential noise impacts from these uses have been identified and assessment criteria have been nominated. Preliminary advice for noise control to achieve the identified criteria to provide for an appropriate level of acoustic amenity to noise sensitive receivers is provided in this report.

Based on our review, it is SLR's professional opinion that the proposed uses can be designed to achieve compliance with the relevant limits and guidelines.

The construction advice provided in this assessment will be refined and developed during the detailed design phase of the project

APPENDIX A

Marked up Plan of Cinemas



Ceiling Type A
4 x 16 mm thick fire rated plasterboard on high defilection mounts, 200 mm thick, 24 kg/m³ glasswool to cavity

Ceiling Type B
3 x 16 mm thick fire rated plasterboard on high defilection mounts, 200 mm thick, 24 kg/m³ glasswool to cavity

LEGEND

WTA (RES) - 4 x 16 mm thick fire rated plasterboard, 100 mm thick GW insulation to wall cavity. Plasterboard to be resiliently mounted off studs usng high deflection rubber isolators and to extend to cinema ceiling.

WTA - 4 x 16 mm thick fire rated plasterboard, 100 mm thick GW insulation to wall cavity or masonry. Wall to be supported of the base buildling slab and to extend to the soffit.

WTB - 3 x 13 mm thick fire rated plasterboard, 100 mm thick GW insulation to wall cavity or masonry. Wall to be supported of the base building slab and to extend to the soffit.

WTC - 2 x 13 mm thick fire rated plasterboard, 100 mm thick GW insulation to wall cavity or masonry. Wall to be supported of the base building slab and to extend to the soffit.

WTD - 1 x 13 mm thick plasterboard, 50 mm thick GW insulation to wall cavity or masonry. Wall to be supported of the base building slab and to extend to the soffit.

SLR
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CINEMAS WALLS AND CEILINGS

East Brunswick Village
Ground Level
Drawing TP17, 19 June 2020

DRAWN	DATE	SCALE	FILE	JOB No.	DRG. No.	REVISION
DW	5-May-20	NTS	640.10205 STAGE 3, LOT 4, WALLS 20200428.XLS	640.10205	1	A (24-06-2020)

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Our Ref: V200358:AC
Contact: Andrew Carr

10 July 2020

G2 Urban Group
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Attention: Giovanni Gattini

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Dear Giovanni,

EAST BRUNSWICK VILLAGE LOT NUMBERS 3 & 4
PARKING ASSESSMENT

Cardno has been engaged to prepare a parking assessment of the proposed inclusion of a gym/yoga studio with reduced dwellings in Lot Number 3; and, the proposed inclusion of a Cinema and reduced retail within Lot Number 4 of the East Brunswick Village (EBV).

The assessment has been based on the latest plans and development schedule of Lot Numbers 3 and 4, prepared by Jam Architects Pty Ltd in June 2020 (Rev. T).

Proposed Development:

It is proposed to develop Lot Number 3 of EBV with gym and yoga studio facilities, a medical centre and associated retail, and residential dwellings above.

The first floor of the development on Lot Number 3 would accommodate a combined total of around 946 square metres of gym and yoga studio space as detailed in Table 1-1, plus 598 square metres of medical suites.

Eleven (11) previously approved residential dwellings (3 one-bedroom with study units, 8 two-bedroom units) are proposed to be removed from the first floor to accommodate the gym/yoga studio facility.

Table 1-1 Lot Number 3 - Gym/Yoga Studio Summary

Component	Area	Measure
Gym	412	Square metres
Yoga Studio 1	303.6	Square metres
Yoga Studio 2	230.3	Square metres
Totals:	***945.9***	***Square metres***

The ground floor would provide 1051.5 square metres of retail.

The remaining floors would continue accommodating residential units with some one and two-bedroom units being reallocated to three-bedroom units.

The proposal seeks to develop Lot Number 4 of EBV with Cinema and associated retail at ground level, with the residential units above. The Cinema would have six Cinemas with an overall total of 405 seats plus associated retail of around 1,374 square metres. Table 1-2 shows the Cinema detail.

The remaining floors would continue accommodating residential units with some one and two-bedroom units being reallocated to three-bedroom units.

Table 1-2 Lot Number 4 - Cinema Summary

Component	Area	Measure	Seats
Cinema 1	256.2	Square metres	115 seats
Cinema 2	163	Square metres	65 seats
Cinema 3	99	Square metres	35 seats
Cinema 4	134.7	Square metres	62 seats
Cinema 5	106.6	Square metres	44 seats
Cinema 6	193.7	Square metres	84 seats
Totals:	***953.2***	***Square metres***	***405* seats**

Vehicle access and parking arrangements for the overall development remain unchanged.

Parking for the gym and yoga studios in Lot Number 3, Cinema in Lot Number 4 and all retail would occur within the 290 retail car parking spaces provided, which is comprised of 271 spaces in the retail car park basement and 19 spaces located at-grade on Main Street.

ITP Development & Parking Provision:

East Brunswick Village is described within the approved Integrated Transport Plan (ITP) dated 27th March 2018 as summarised in the following table.

Table 1-3 East Brunswick Village ITP Development Summary

Component	Area/Number	Measure	Parking Number
Residential	800 to 840	Apartments	800 to 840
Medical	500 to 550 (6)	Square metres (practioners)	18 to 20 *
Office	2,500 to 2,600	Square metres	60 to 70
Retail (specialty & supermarket)	7,800 to 8,000	Square metres	282 to 300 *

*: *ITP identified 300 to 320 spaces total for retail and medical*

The above table shows the development contemplated within the ITP.

The Integrated Transport Plan (ITP) identifies the following parking rates:

- *3.5 spaces per 100 square metres for retail,*
- *3.5 spaces per 100 square metres for medical centre,*
- *4.0 spaces per 100 square metres for supermarket,*
- *Residential parking at overall rates of not less than 0.5 per bedsit, 0.64 per one bedroom, 1.0 per two bedroom and 1.5 per three bedroom dwelling, in accordance with Council recommendations.*
- *Office car parking at a rate of not less than 2.5 spaces per 100sq.m of floor area.*

Endorsed Development & Parking Provision:

Table 1-4 shows the development composition as shown by the plans endorsed on 17th October 2019.

Table 1-4 East Brunswick Village Endorsed Plans Development Summary

Component	Area/Number	Measure	Parking Number
Residential	770	Apartments	810
Medical	545.2	Square metres	26
Office	2,549.8	Square metres	62
Retail (specialty & supermarket)	6,319.8 *	Square metres	282

*: *Retail comprised of 3,944.6sqm specialty and 2,375.2sqm supermarket (not including 583.3 supermarket back-of-house and 367 m^2 specialty back-of-house)*

The above table shows that the endorsed plans are in accordance with the development anticipated within the ITP.

Proposed Development Composition:

Table 1-5 shows the anticipated composition of EBV inclusive of the gym/yoga studio space and medical suites in Lot Number 3 and the Cinema in Lot Number 4, with associated retail.

Table 1-5 East Brunswick Village Proposal Development Summary

Component	Area/Number	Measure	Parking Number
Residential	755	Apartments	809
Medical	598	Square metres	27
Office	2,549.8	Square metres	62
Retail (specialty & supermarket)	5,867.3 *	Square metres	290 **
Gym/Yoga Studio	945.9	Square metres	**
Cinema	405 953.2	Seats Square metres	**

*: *Retail comprised of 3,492.1sqm specialty and 2,375.2sqm supermarket (not including 583.3 supermarket back-of-house)*

**: *Cinema and gym/yoga studio parking to occur in retail parking area*

Comparison of Proposed Development:

The proposed EBV development, inclusive of gym/yoga studio facilities on Lot Number 3 and a Cinema on Lot Number 4, is comparable to both the ITP and the endorsed development.

The overall parking provision and vehicle access arrangements are unchanged from the endorsed plans and in accordance with the ITP and thus satisfy requirements.

The bicycle parking provisions are unchanged from the ITP and the endorsed plans and thus satisfy requirements.

The development areas are generally comparable with both the ITP and the endorsed plans, with reduced number of residential dwellings and retail space, and the addition of a gym/yoga studio facility and a Cinema.

Table 1-6 shows a comparison of the ITP development, the endorsed plans and the proposed development inclusive of a gym/yoga space within Lot Number 3 and a Cinema within Lot Number 4.

Table 1-6 East Brunswick Village Comparison of Proposal

Component	Proposal Area/Number	Measure	ITP Area/Number	Measure	Endorsed Plans Area/Number	Measure
Residential	755	Apts'	800 to 900	Apts'	770	Apts'
Medical	598	Sqm	500 to 550	Sqm	545.2	Sqm
Office	2,549.8	Sqm	2,500 to 2,600	Sqm	2,549.8	Sqm
Retail (specialty & supermarket)	5,867.3 *	Sqm	7,800 to 8,000	Sqm	6,319.8	Sqm
Gym/Yoga Studio	945.9	Sqm	n/a	Sqm	n/a	Sqm
Cinema	405 953.2	Seats Sqm	n/a	Seats Sqm	n/a	Seats Sqm

*: *Retail comprised of 3,492.1sqm specialty and 2,375.2sqm supermarket (not including 583.3 supermarket back-of-house)*

The above table shows that the proposed development includes 15 fewer residential units and approximately 450 square metres less of specialty retail and supermarket space than the endorsed plans.

The office component use remains unchanged in the proposed plans, while the floor area for medical suites is marginally higher (by approximately 50 square metres) than both the endorsed plans and the approved ITP.

The proposed development also accommodates gym/yoga studio facilities on Lot Number 3 and a Cinema on Lot Number 4, which were not component uses in the approved ITP and endorsed plans.

However, the increase in additional component uses – gym/yoga studio and Cinema – is offset by the reduction in residential units and retail floor area, and the overall proposed development remains comparable with the ITP development and the endorsed plans development.

Car Parking Adequacy:

Planning Parking Requirement:

Clause 52.06 of the City of Moreland Planning Scheme sets out the statutory requirements for car parking for the proposed uses as follows:

- *Cinema: 0.3 car spaces per patron permitted*
- *Retail: 3.5 car spaces per 100 square metres of leasable floor area (consistent with ITP parking rates)*
- *Supermarket: 5.0 car spaces per 100 square metres of leasable floor area (ITP parking rate of 4.0 car spaces per 100 square metres of leasable floor area has been adopted for analysis)*

The Planning Scheme does not specify a parking requirement rate for gymnasiums. The New South Wales Roads and Traffic Authority (RTA) produced the document "Guide to Traffic generating Developments" dated October 2002, which identifies peak parking rates for alternate land uses, including gymnasiums, based on surveys of existing facilities. There is no Victorian equivalent of this document.

The RTA Guide to Traffic Generating Developments (2002) sets out the following recommended off-street parking provision for gymnasiums located within a metropolitan regional centre:

- *Gym: 3.0 spaces per 100 square metres gross floor area of gymnasiums*

As the subject site is located within a Neighbourhood Activity Centre and in close proximity to tram and bus services, the recommended rate of 3.0 spaces per 100 square metres of gym has been adopted as a starting point for evaluating the parking provisions.

Considering the above, the parking requirement for Lot Number 3 gym/yoga studio, Lot Number 4 Cinema and all retail components is thus 389 spaces, comprised of 121 Cinema spaces, 28 gym/yoga spaces and 240 retail spaces.

Cinema Case Study Data:

Case Study data for Cinema parking shows the following usage:

- 6% to 16% weekdays, daytime,
- 20% weekday evenings,
- 20% Saturday, daytime,
- 35% to 55% Saturday, evening.

Retail Case Study Data:

Retail parking requirements reduce after 5.00pm on both weekdays and weekends. Parking is less than 60 percent of the peak requirement by 7.00pm.

Gym Case Study Data:

Case study data for fitness centres shows that the parking demands readily compliment the parking demands of retail/commercial land uses in the local area, with visitation rates being highest early in the week, that is Monday/Tuesday/Wednesday, and dropping to much lower levels on Thursday/Friday/Saturday. This day-of-week profile is the exact opposite of retail activity, which is low early in the week and peaks on Fridays and Saturdays.

Peak gym usage also occurs in the early morning and later evening, outside of normal business trading hours, and decreases across other periods of the day. Therefore, during the peak periods of operation of the other uses on the site, the parking demand associated with the gym is expected to be less than in the early morning or late evening. These considerations demonstrate that for mixed use developments that share car parking, a health club use provides an ideal association with retail uses.

For the purposes of analysis, a 100% peak parking generation for the gym has been assumed during the late evening only. A peak parking generation of 50% has been assumed during the peak periods of car parking demand associated with the other uses on the site and 30% at all other remaining times. Peak parking generation rates of 50% and 30% equate to car parking demand in the order of 2.25 spaces and 1.35 spaces per 100 square metres for the gym/yoga studio component.

Overall Development:

An assessment of the proposed development plans compared to the car parking rates proposed in the ITP, City of Moreland Planning Scheme and RTA Guide to Traffic Generating Developments (2002) is set out in Table 1-7.

Table 1-7 Assessment of Proposed Development Parking Demands

Component	Proposal Area / Number	Parking Rate Measure	Parking Rate	Required Spaces	Parking Provided
Residential	755	Apts'		673	809
One Bedroom (with and without study/home office)	*320*	*Apts'*	*0.64 spaces per unit*	*204*	
Two Bedroom (with and without study/home office)	*366*	*Apts'*	*1.0 space per unit*	*366*	
Three Bedroom	*69*	*Apts'*	*1.5 spaces per unit*	*103*	
Medical	598	Sqm	3.5 spaces per 100sqm	20	27
Office	2,549.8	Sqm	2.5 spaces per 100sqm	63	62
Retail (specialty & supermarket)	6,450.6 *	Sqm	3.5 spaces per 100sqm	240	290**
Gym/Yoga Studio	945.9	Sqm	3.0 spaces per 100sqm	28	**
Cinema	405 953.2	Seats Sqm	0.3 per seat	121	**

*: *Retail comprised of 3,492.1sqm specialty, 2,375.2sqm supermarket, including 583.3 supermarket back-of-house)*

**: *Cinema and gym/yoga studio parking to occur in retail parking area*

As shown above, the proposed provision generally aligns with car parking demand for the residential, medical and office uses within the EBV.

The following section reviews the car parking provisions for the additional gym/yoga studio space and Cinema, for which parking will occur in the retail car park.

Retail, Gym/Yoga Studio and Cinema Parking:

A total of 290 parking spaces are to be available for retail, gym/yoga studio and Cinema parking, comprised of 271 in the retail car park (basement) and 19 spaces located at-grade on Main Street.

Table 1-8 summarises the parking requirements for retail and Cinema uses under the Planning Scheme and for the gym/yoga studio space use based on recommendations in the RTA Guide to Traffic Generating Developments (2002).

Table 1-8 East Brunswick Village Retail and Cinema Component Planning Parking Requirements

Component	Proposal Area/Number	Parking Rate Measure		Required Spaces
Retail: Specialty	3,492.1	Sqm	3.5 spaces per 100sqm	122
Retail: Supermarket*	2,958.5	Sqm	4.0 spaces per 100sqm	118
Gym/Yoga Studio	945.9	Sqm	3.0 spaces per 100sqm	28
Cinema	405 953.2	Seats Sqm	0.3 per seat	121

**: Retail: Supermarket comprised of 2,375.2sqm supermarket and 583.3 supermarket back-of-house*

The parking requirement for the retail, gym/yoga studio and Cinema varies by the time-of-day and with the day of the week. Table 1-9 shows the anticipated combined parking requirement of the specialty retail, supermarket, gym/yoga studio and Cinema at key points in time.

Table 1-9 Anticipated Peak Parking Demand of the proposed development

Component	Component Requirement	Future 1	Use	Future 2	Use	Future 3	Use	Future 4	Use	Future 5	Use
		Daytime		Early Evening		Late Evening		Saturday Noon		Saturday Evening	
Retail: Specialty	122	122	1	73	0.6	73	0.6	122	1	73	0.6
Retail: Supermarket	118	118	1	70	0.6	70	0.6	118	1	70	0.6
Gym/Yoga Studio	28	8	0.3	14	0.5	28	1	14	0.5	8	0.3
Cinema	121	19	0.16	24	0.2	24	0.16	24	0.2	66	0.55
Total		267		181		195		278		217	

The above table shows that the proposed provision of 290 spaces for retail and Cinema parking is expected to accommodate the anticipated parking requirements.

Further, the gym/yoga studio facilities are likely to cater to local customers to a significant extent, drawing from the surrounding mixed-use development and further reducing car parking demand within EBV.

Traffic Generation:

Peak gym/yoga studio and Cinema activity typically occurs outside peak commuter traffic intervals, and is consequently not expected to have any significant effect on peak traffic conditions.

Case study data shows that peak Cinema attendance for this development is expected to occur during the evening after the PM peak period. A peak hourly Cinema traffic generation of around 66 vehicle movements is anticipated based on the anticipated peak vehicle accumulation and an adopted two hour duration-of-stay. Similarly, a peak hourly traffic generation of 28 vehicles is anticipated for the gym/yoga studio component. The combined level of traffic activity equates to 1 – 2 vehicle movements per minute, which is low in traffic engineering terms and is expected to have no significant effect on traffic conditions.

Vehicle access associated with the Cinema and gym/yoga studio use is proposed to occur via the approved EBV access arrangements, with vehicles accessing via the Main Street and the traffic signal controlled Nicholson Street access intersection.

It is concluded that the proposed gym and yoga studio in Lot Number 3 and Cinema in Lot Number 4 are expected to have no significant effect on traffic conditions.

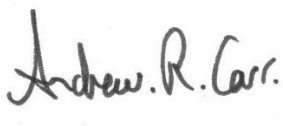
Conclusions:

Having evaluated the proposed inclusion of a gym/yoga studio with reduced dwellings within Lot Number 3, and a Cinema and reduced retail within Lot Number 4 of East Brunswick Village, it is concluded as follows:

- Vehicle access and parking arrangements are to remain largely unchanged.
- The Cinema and retail parking is to be accommodated within the 290 retail car parking spaces, comprised of 271 in the retail car park basement and 19 spaces located at-grade on Main Street.
- The proposed development, inclusive of the Lot Number 3 gym/yoga studio and Lot Number 4 Cinema, is comparable with the development identified within the ITP and the endorsed Plans.
- The proposed provision of 290 spaces for retail, gym/yoga studio and Cinema parking is expected to accommodate the anticipated parking requirements.
- The proposed gym/yoga studio and Cinema are expected to have no significant effect on traffic conditions.

I trust this information is of assistance.

Yours sincerely,



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