

## **ATTACHMENT 6**



EMERGEN

DEPARTMENT OF PLANNING, LANDS  
AND HERITAGE

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TOWN OF VICTORIA PARK  
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# SUSTAINABILITY DESIGN REPORT

## METRO APARTMENTS

167 & 169 BANK STREET, EAST VICTORIA PARK, WA, 6003

### PREPARED BY

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Project: 125732

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## 1 STATE PLANNING POLICY SUMMARY

EMERGEN (a division of CADDIS GROUP), in collaboration with the design team (Ryan Tsen Architects) has developed a sustainable design strategy for the proposed 167 & 169 Bank Street, Northbridge, WA, 6003, aligning with *State Planning Policy 7.0*, which focuses on the Design of the Built Environment - specifically, Principle 5: Sustainability.

This report serves the vital purpose of bolstering the development application by articulating the sustainability principles and commitments for the project site. We acknowledge the significance of State Planning Policy 7.0 in promoting sustainability within the built environment. Good design, as outlined in the policy, is not only about aesthetics but also optimises the sustainability of our built surroundings, yielding positive outcomes on environmental, social, and economic fronts.

Our approach to sustainable landscape and urban design adheres closely to the established water-sensitive urban design principles, ensuring minimal adverse impacts on existing natural features and ecological processes while promoting green infrastructure at all scales of the project. Furthermore, our strategy for sustainable built environments embraces passive environmental design measures tailored to local climate and site conditions. This includes careful consideration of optimal orientation, shading, building envelope, and natural ventilation, ultimately reducing reliance on energy-intensive heating and cooling technologies. This, in turn, results in reduced energy consumption, decreased resource usage, and lowered operating costs throughout the project's lifecycle.







### 1.1 DESIGN AND CONSTRUCT TO AUSTRALIAN BEST PRACTICE

The design team will utilise a structured approach to a sustainable outcome for the design and construction of the development including the following Sustainable Targets.

Table 1: Sustainability Targets

| DESCRIPTION              | GOAL  | SUSTAINABILITY COMMITMENTS  |
|--------------------------|---|---|
| CLEAR AIR                | Improve indoor environment quality and health and wellbeing of occupants. | Outdoor air provided to primary areas at a rate at least <b>50%</b> greater than minimum in AS 1668.2:2012. <i>(TBC based on mechanical consultant).</i>  |
| LIGHT QUALITY            |   | Above <b>40%</b> of the regularly occupied areas have high level of daylight (above 160 Lux).   |
| EXPOSURE TO TOXINS       |   | The building's paints adhesives, sealants, and carpets are low in TVOC or non-toxic.<br>The building's engineered wood products are low in TVOC or non-toxic.<br>Occupants are not exposed to banned or highly toxic materials in the building. |
| HEAT RESILIENCE          | Reduce impacts of long-term performance.                                  | Light Roof Colour (SRI below 0.50)  |
| ENERGY USE               | Reduce emissions and water use.   | A minimum of <b>30%</b> offset in operational energy usage  |
| WATER USE                |   | High WELS Ratings (these equal to above <b>30%</b> reduction in potable water).   |
| LIGHTING USE             |   | <b>20%</b> reduction in lighting power when compared to NCC DTS.  |
| MOVEMENT AND PLACE       | Low carbon options.   | Provision for 2 x EV Charging Bays  |
| DESIGN FOR INCLUSION     | Social health.  | Disability Access and inclusive design  |
| BIODIVERSITY ENHANCEMENT | Improved Nature outcomes.   | Plant additional local native trees on the site to further shade the outdoor areas and structures.<br>Climate Resilience, drought tolerant planting.  |





## 2 PROJECT INFORMATION

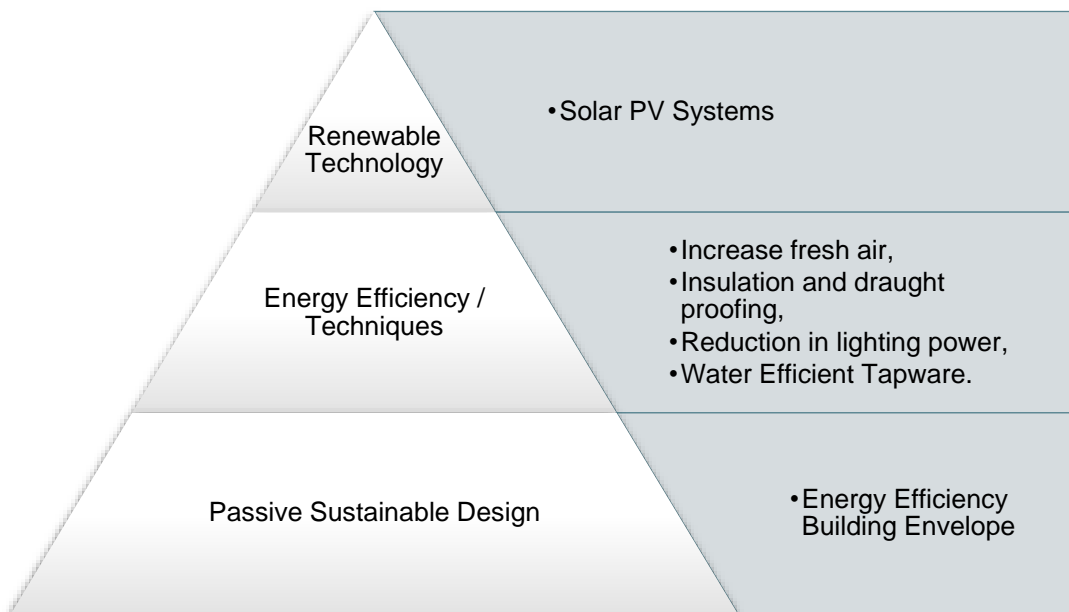
The proposed project is located on previously developed land, used for farming and commercial use. The site sold and now being redeveloped for residential and community use.

Image 1 Existing Site Images



## 3 ENERGY REDUCTION STRATEGY

Table 2 Energy Reduction Strategy





## 4 ENERGY USE

## 4.1 BUILDING FABRIC FOR RESIDENTIAL

The modelling demonstrated ability to achieve minimum of **6.5** and an average of **7.5** Star NatHERS Rating.

Table 2: Assumed construction type

| CONSTRUCTION           |                                  | MATERIALS  |
|------------------------|----------------------------------|--|
| EXTERNAL & PARTY WALLS | External Wall Type 1:            | Fibre Cement Stud-Frame Wall + Internal Plasterboard Lining<br><b>Insulated with 90mm R2.5HD Insulation Batts</b>  |
|                        | External Wall Type 2:            | 300mm Concrete Structural Wall + Internal Plasterboard Lining  |
|                        | Party Walls:                     | Double-Stud Frame + Internal Plasterboard Lining<br><b>Insulated with 75mm R2.0 Insulation Batts on each side.</b> |
|                        | Corridor Walls                   | Fibre Cement Stud-Frame Wall + Internal Plasterboard Lining<br><b>Insulated with 90mm R2.5HD Insulation Batts</b>  |
| INTERNAL WALLS         | Internal Apartment Walls Type 1: | Internal Stud-Frame Walls  |
|                        | Internal Apartment Walls Type 2: | 300mm Concrete Structural Wall + Plasterboard Lining on Both Sides   |
| FLOORS                 | Construction Type 1:             | 250mm Suspended Concrete Slab  |
|                        | Construction Type 2:             | 250mm Suspended Concrete Slab<br><b>30mm R1.3 K10 Soffit Insulation to exposed slab areas</b>                      |
|                        | Coverings                        | <i>Tiles to Wet areas and carpet to remaining.</i>   |
| CEILINGS/<br>ROOF      | Construction Type 1:             | 250mm Suspended Concrete Slab  |
|                        | Construction Type 2:             | Metal Framed Roof<br><b>165mm R3.0 Insulation Batt to exposed roof areas</b>                                       |







| GLAZING SPECIFICATION FOR APARTMENTS |   | U-Value | SHGC (+/- 5%) |
|--------------------------------------|---|---------|---------------|
| <b>OPTION 1</b>                      |   |         |               |
| <b>AWNING WINDOW</b>                 | Single-Glazed Clear, in Aluminium Frame | 6.29    | 0.60          |
| <b>SLIDING DOOR</b>                  | Single-Glazed Clear, in Aluminium Frame | 6.16    | 0.71          |
| <b>OPTION 2</b>                      |   |         |               |
| <b>AWNING WINDOW</b>                 | Double-Glazed Clear, in Aluminium Frame | 3.90    | 0.58          |
| <b>SLIDING DOOR</b>                  | Double-Glazed Clear, in Aluminium Frame | 4.23    | 0.59          |

#### 4.1.1 NATHERS RESULTS

Table 3: NatHERS Outcome

| APARTMENT TYPE | APT NO.       | BASE | OPTION 1 (SINGLE GLAZING) | OPTION 2 (DOUBLE GLAZING) |
|----------------|---------------|------|---------------------------|---------------------------|
| TYPE 1B        | <b>2-1B</b>   | 5.2  | 5.3                       | 6.5                       |
| TYPE 2C        | <b>2-2C</b>   | 6.9  | 7.0                       | 7.4                       |
| TYPE 2B        | <b>2-2B</b>   | 7.1  | 7.3                       | 8                         |
| TYPE 2D        | <b>3-9-2D</b> | 6.6  | 6.7                       | 7.5                       |
| TYPE 2A        | <b>10-2A</b>  | 5.9  | 6.1                       | 6.9                       |
| TYPE 2C        | <b>15-2C</b>  | 5.3  | 5.4                       | 6.1                       |
| TYPE 2E        | <b>15-2E</b>  | 4.9  | 5.1                       | 6.4                       |





## 4.2 BUILDING FABRIC FOR COMMERCIAL

Based on the modelled outcome EMERGEN suggest the following building fabric and glazing specification.

Table 4: Proposed Building Specification

| CONSTRUCTION   |                                | DESCRIPTION   | REQUIREMENT  |
|----------------|--------------------------------|---|--|
| ENVELOPE WALLS | <b>External Concrete Wall</b>  | 150mm Concrete tilt wall.<br>External finishes as per elevations.                                       | <b>No Insulation Required.</b>   |
|                | <b>Steel Framed Wall</b>       | FC Cladding on 90mm steel framed stud with plasterboard lining.<br>External finishes as per elevations. | <b>R2.5 Insulation Batts &amp; R0.2 Thermal Break.</b>                                 |
| INTERNAL WALLS | <b>Steel Framed Wall</b>       | FC Cladding on 90mm steel framed stud with plasterboard lining.<br>External finishes as per elevations. | <b>R2.5 Insulation Batts &amp; R0.2 Thermal Break.</b>                                 |
|                | <b>Steel Framed Wall</b>       | Double Steel framed stud with plasterboard lining.  | <b>R4.0 Insulation Batts.<br/>No Insulation Required.</b>                              |
| FLOORS         | <b>Slab on Ground</b>          | Concrete slab with ground contact.<br>Floor coverings as per plans.                                     | <b>No Insulation Required.</b>   |
|                | <b>Suspended Concrete Slab</b> | Suspended concrete slab. Floor coverings as per plans.  | <b>No Insulation Required.</b>   |
| ROOFS          | <b>Suspended Concrete Slab</b> | Suspended concrete slab. Floor coverings as per plans.  | <b>No Insulation Required.</b>   |
|                | <b>Roof Type 1</b>             | Metal deck roof sheeting.<br><b>Surfmist (SA: 0.55).</b>  | <b>60mm Anticon (R1.3) with R3.0 Insulation Batts to dropped plasterboard ceilings</b> |

| WINDOW SPECIFICATION |   | U-Value     | SHGC        |
|----------------------|---|-------------|-------------|
| TYPE 1               | Single Clear glazing in aluminium frame.<br>(i.e., 6.00mm <b>EVantage Clear</b> , or equal) | <b>4.58</b> | <b>0.59</b> |

Note: Glazing values provided are for Whole System (Frame + Glass)





## RESULTS

The figures shown below demonstrate the difference in performance between the proposed building and the reference building, allowing for a quantifiable comparison on the performance of each building.

Table 5: Estimated Energy Use

| MODEL                 | HEATING | COOLING | FANS | LIGHTS | EQUIP | PV     | TOTAL        |
|-----------------------|---------|---------|------|--------|-------|--------|--------------|
| REFERENCE<br>(KWH/M2) | 2.9     | 15.5    | 9.2  | 63.5   | 1.7   | -      | <b>92.8</b>  |
| PROPOSED<br>(KWH/M2)  | 3.6     | 12.0    | 8.3  | 63.5   | 1.7   | - 33.9 | <b>51.3</b>  |
| ENERGY REDUCTION      |         |         |      |        |       |        | <b>41.9%</b> |

A **25kW** solar PV system has been modelled with the proposed building to help offset total energy consumption.

Table 6: Predicted Mean Vote (PMV) Summary

| PREDICTED MEAN<br>VOTE - % HOURS IN<br>RANGE FOR | <= -1.00 | >-1.00 TO <=1.00 | >1.00 |
|--|----------|------------------|-------|
| Class 2  | 0        | 100.0            | 0     |

## 5 HEALTH AND WELLBEING

### 5.1 PROVISIONS FOR INCREASED OUTDOOR AIR

Pollutants entering the building are minimised, and a high level of fresh air is provided to ensure levels of indoor pollutants are maintained at acceptable levels. It is proposed that outdoor air provided to primary areas will be at a rate at least 50% greater than minimum in AS 1668.2:2012, this will need to be confirmed by the mechanical engineer.

## 6 LIGHTING COMFORT

Lighting within the building must meet the following criteria:

- All lighting must be flicker-free.
- Light sources must have a minimum Colour Rendering Index (CRI) average R1 to R8 of 85 or higher and have a CRI R9 of 50 or higher.
- Light sources must meet best practice illuminance levels for each task within each space type with a maintained illuminance that meets the levels recommended in AS/NZS 1680.1:2006 series applicable to the project type and including maintenance.
- The maintained Illuminance values must achieve a uniformity of no less than that specified in Table 3.2 of AS/NZS 1680.1:2006, with a maintenance factor method as defined in AS/NZS 1680.4.; and





- All light sources must have a minimum of 3 MacAdam Ellipses.
- The walls within the field of view of occupants in regularly occupied spaces must have an average surface reflectance value of 0.70 and an average surface illuminance of at least 50% of the horizontal illuminance levels required for task.
- Vertical illuminance in workspaces: ensure that 50% of the horizontal task illuminance reaches the average eye height for 90% of primary spaces using vertical illuminance calculation grid.
- The illuminance values must be calculated in accordance with AS/NZS 1680 series for the relevant task.

### 6.1 EFFICIENT LIGHTING AND CONTROL

The installed aggregate illumination power has been designed to be **20%** below the maximum illumination power based on maximum allowable lighting power densities defined in Table J6.2a of the NCC 2019. Motion Detectors and daylight sensors are provided to reduce demand.

Table 7: Lighting Characteristics

| PARAMETER  | PROPOSED BUILDING  | REFERENCE BUILDING           |
|--|--|------------------------------|
| LIGHTING TYPE                                      | LED light fittings   | LED light fittings           |
| DESIGN ILLUMINANCE (LUX)                           | Various lux  | Various lux                  |
| NOMINAL LIGHTING POWER DENSITY (W/M <sup>2</sup> ) | <b>20%</b> less compared to NCC max requirements.                        | As per NCC max requirements. |
| OCCUPANT SENSOR CONTROLS                           | Motion sensors   | N/A                          |
| DAYLIGHT CONTROLS                                  | Yes  | N/A                          |
| OTHER LIGHTING CONTROLS                            | Timer switches   | N/A                          |
| ADJUSTMENT FACTOR APPLIED                          | 0.9 – Motion sensor 1<br>0.7 – Motion sensor 2<br>0.55 – Motion sensor 3 | Room Aspect Ratio            |





### 6.2 DAYLIGHTING

Emergen have completed preliminary daylight modelling. The analysis has been undertaken using IES software at finished floor level based on CIE standard overcast sky. The study boundary includes Primary Spaces only.

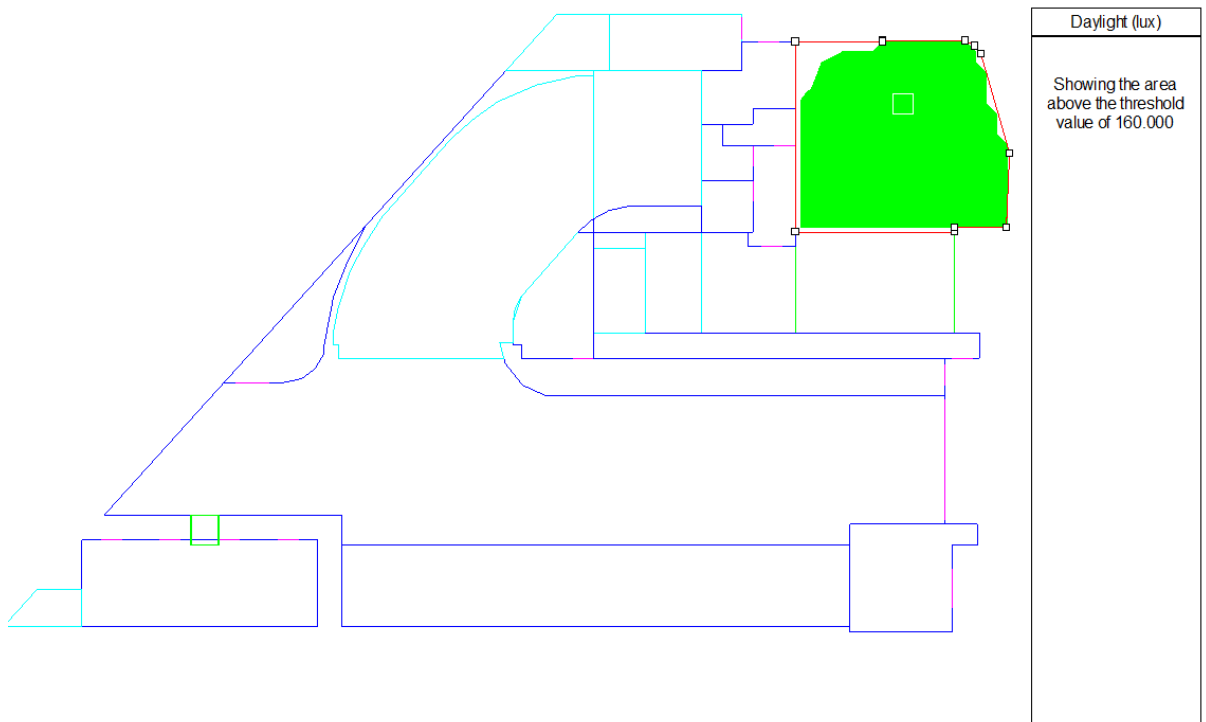
Table 8: Calculations Conditions - Daylight

| CALCULATION CONDITIONS |                                |
|------------------------|--------------------------------|
| TEST FACTOR            | Daylight Factor                |
| SKY FACTOR             | CIE Overcast Sky               |
| DATE                   | March 21 <sup>st</sup> 12:00pm |

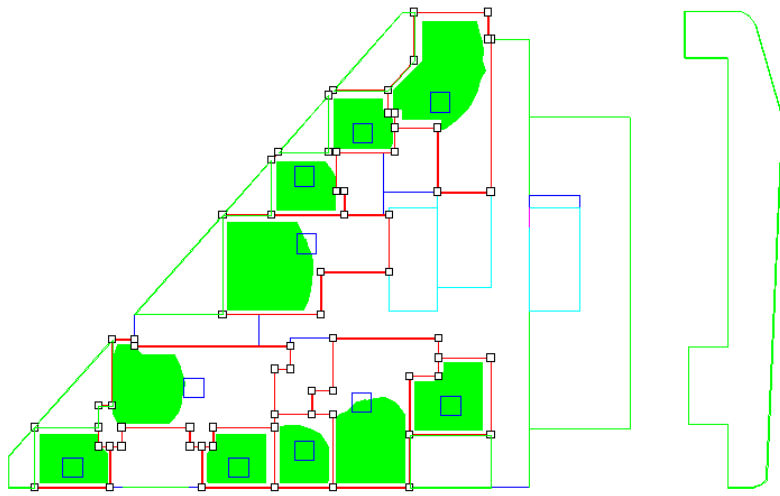
Table 9: Daylighting

| BUILDING      | PROPOSE USAGE | NOMINATED AREA (M <sup>2</sup> ) | COMPLIANT AREA (M <sup>2</sup> ) | COMPLIANT AREA (%) |
|---------------|---------------|----------------------------------|----------------------------------|--------------------|
| TYPICAL FLOOR | Primary       | 5,046.46                         | 3,152.81                         | 62.4%              |

Ground floor



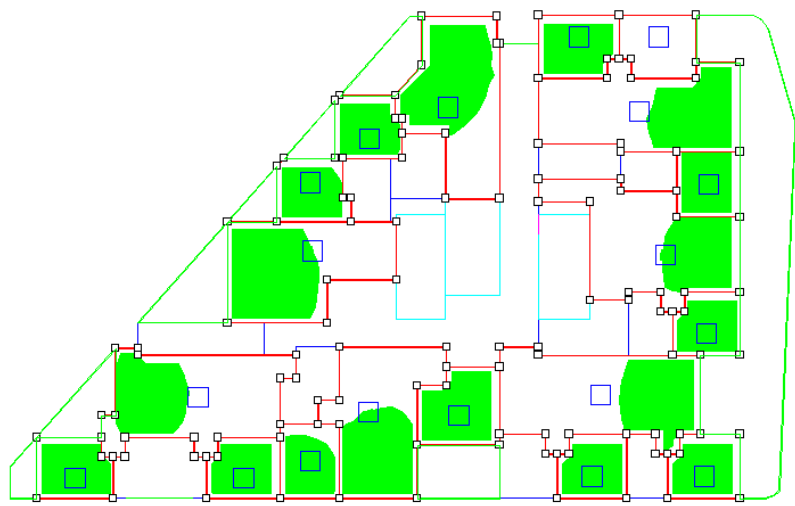




Daylight (lux)

Showing the area above the threshold value of 160.000

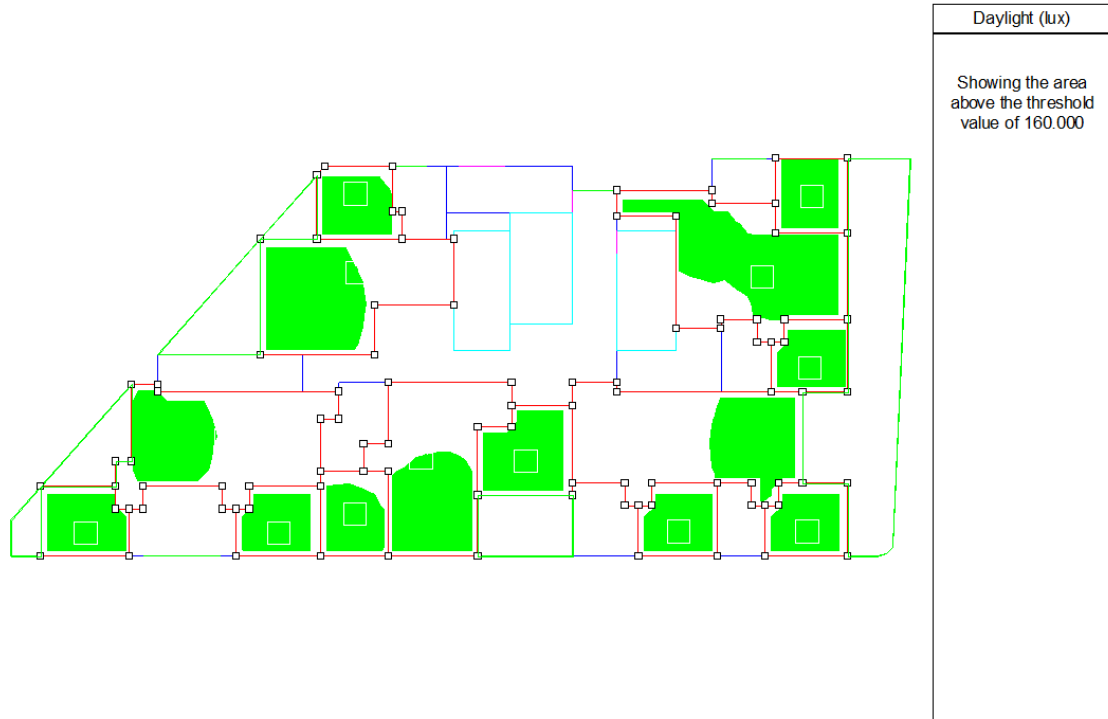
Level 3-10



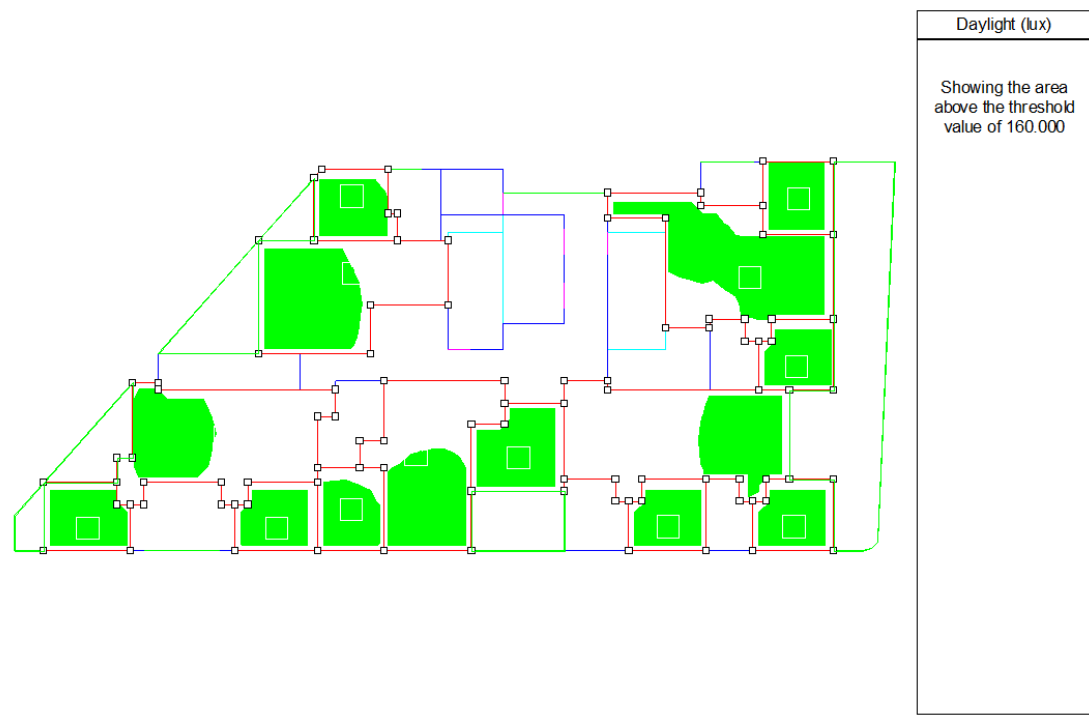
Daylight (lux)

Showing the area above the threshold value of 160.000

Level 11



Level 12-15





### 6.3 SOLAR ANALYSIS

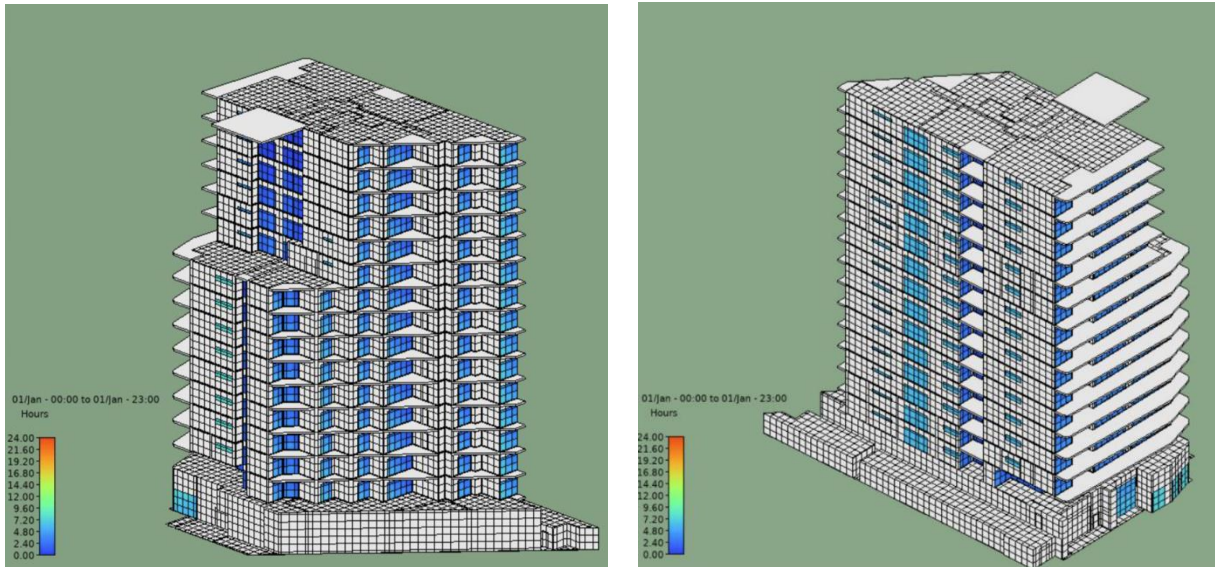


Figure 1: Solar analysis

The shading elements have been strategically designed to minimize extended solar exposure. Each window, as a result, receives approximately 1 to 5 hours of daylight over the course of the day, striking a balance between harnessing natural light and mitigating excessive sunlight exposure.

## 7 WATER EFFICIENCY

### 7.1 SUSTAINABLE WATER INITIATIVES

All new water fixtures are to ensure that high WELS rating fixtures and fitting are to be specified in line with minimum benchmarks below.

Table 10: WELS Ratings

| FIXTURE / EQUIPMENT TYPE | WELS RATING |
|--------------------------|-------------|
| TAPS                     | 5 Star      |
| TOILETS                  | 5 Star      |
| SHOWERS                  | 3 Star      |
| DISHWASHERS              | 5 Star      |

Table 11: Estimated Water Use

| FITTINGS | PROPOSED BUILDING WATER DEMAND (KL/YEAR) | STANDARD PRACTICE BUILDING WATER DEMAND (KL/YEAR) |
|----------|--|---|
| TOILETS  | 3,211.4                                  | 6,422.9   |





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|             |              |          |
|-------------|--------------|----------|
| INDOOR TAPS | 1,047.2      | 1,963.5  |
| SHOWERS     | 13,071.8     | 21,806.4 |
| DISHWASHERS | 305.2        | 448.5    |
| REDUCTION   | <b>44.0%</b> |          |

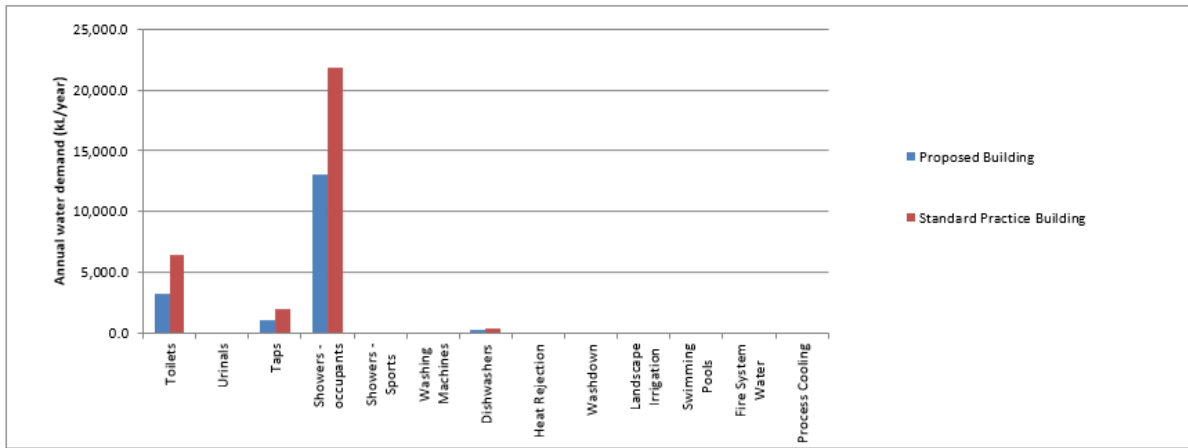


Figure 2: Graph for Estimated Water Use





## 8 MOVEMENT AND PLACE

### 8.1 BICYCLE PARKING FACILITIES & SUSTAINABLE TRANSPORT FACILITIES

It is the intention of this category to reduce occupant's dependency on carbon intensive vehicles. The development will install infrastructure to allow for future installation of EV charging stations.

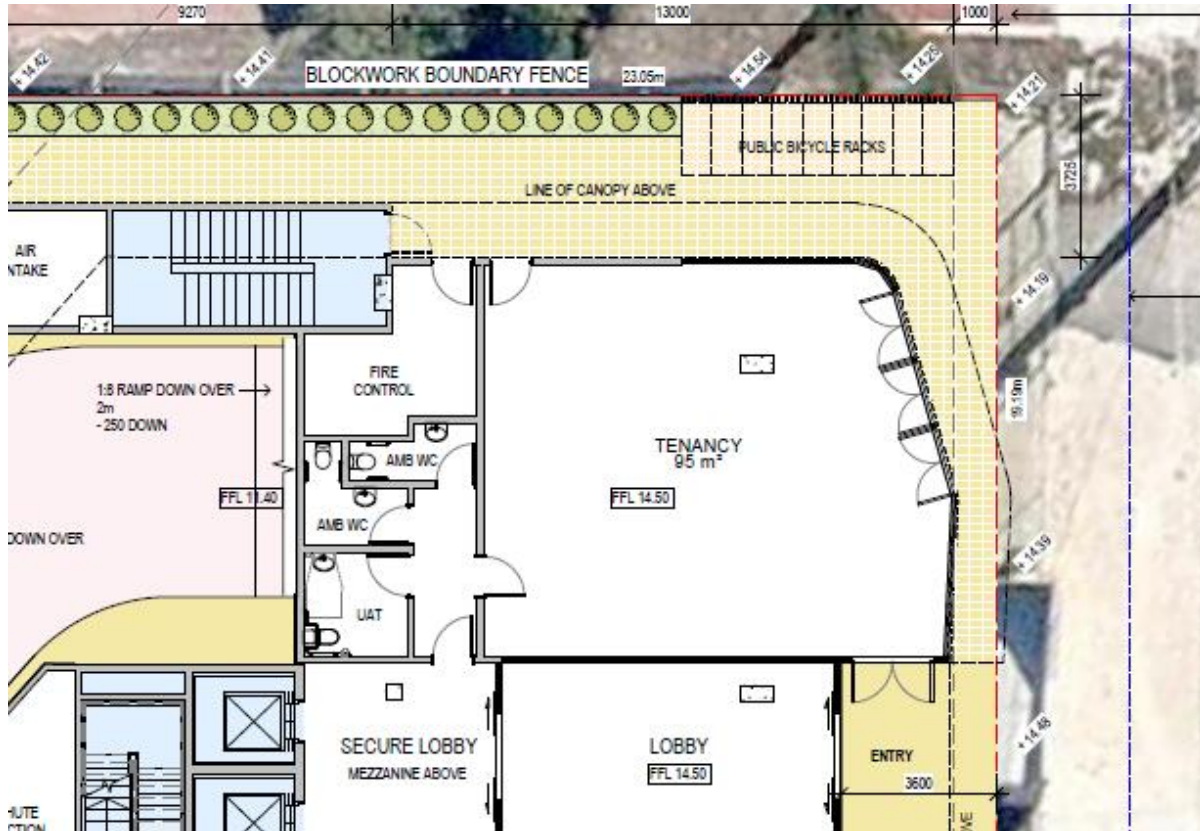


Figure 3: Bike Racks

### 8.2 ENCOURAGING WALKABILITY

The building's design and location encourage walking to and from a number of amenities. This means designing roads within the building boundary to prioritise pedestrians, and either providing within, or being located close to, several amenities.







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# 169 Bank Street

East Victoria Park, Perth, 6101

Commute to **Downtown Perth**

14 min 17 min 39 min 60+ min View Routes

[Favorite](#)
[Map](#)
[Nearby Apartments](#)

**Walk Score 69**  
**Somewhat Walkable**  
 Some errands can be accomplished on foot.

**Transit Score 63**  
**Good Transit**  
 Many nearby public transportation options.

[About your score](#)

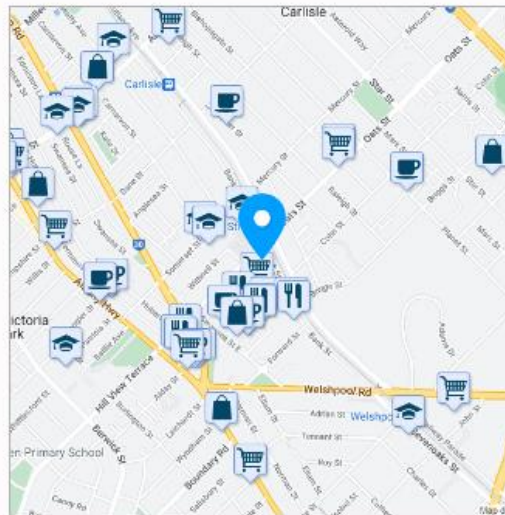


Figure 4: Walkability score of the site

## 9 LAND USE AND ECOLOGY

### 9.1 HEAT ISLAND EFFECT

The project will dedicate more than **50%** of the entire site area to include one or a combination of the following:

- Vegetation.
- Roofing materials, including shading structures, having the following:
  - For roof pitched <15°– a three-year SRI of minimum 64; or
  - For roof pitched >15°– a three-year SRI of minimum 34.
- Only where the three-year Solar Reflectance Index (SRI) for products is not available, use the following:
  - For roof pitched <15° – an initial SRI of minimum 82; or
  - For roof pitched >15° – an initial SRI of minimum 39.
- Unshaded hard-scaping elements with a three-year SRI of minimum 34 or an initial SRI of minimum 39.
- Hardscaping elements shaded by overhanging vegetation or roof structures, including solar hot water panels and photovoltaic panels.





## 9.2 BIODIVERSITY ENHANCEMENT

Landscaping should consist of native vegetation with crop coefficient of 0.5 or below. All landscaping irrigation to include drip irrigation and include moisture sensor override or alternatively the use of Xeriscape Garden. Where Xeriscape Garden is implemented, there will be a provision for the removal of irrigation within three months of landscaping installation reducing the need for watering after. Water for landscaping will be from non-portable sources (where available).

## 9.3 WASTE EFFICIENCY

A waste planning expert will produce a Waste Management Plan (OWMP) that addresses best practice in waste management, including:

- Identifying the objectives of the plan, by setting diversion from landfill targets and / or target for reducing total materials generation (general waste materials + recyclable / reusable materials);
- Clearly identify waste streams including general waste, paper and cardboard, glass and plastic;
- Clearly identify applicable bins for various waste streams, that allow for separation of recyclable streams – or use of comingled systems where appropriate.
- Clearly identify at least one other waste stream that can be recycled, and for which recycling facilities are provided.
- Clearly identify storage areas for all waste streams identified in the OWMP.
  - Area to be sized sufficiently for all streams nominated above, based on waste generated by the project and the collection frequency for each stream; and
  - Calculations shall be based on third-party best practice guidelines.
- Outline best practice access requirements for the collection of all waste streams identified in the OWMP.
- Outline individual roles responsible for delivering and reviewing the OWMP

# 10 EXPOSURE TO TOXINS

## 10.1 PAINTS, ADHESIVES, SEALANTS AND CARPETS

To meet the requirements, at least 95% of internally applied paints, adhesives, sealants (by volume), and carpets (by area) must meet TVOC (Total Volatile Organic Compounds) limits. Compliance with these limits can be achieved through one of the following methods:

1. Product Certification Scheme: The contractor can use products that are certified under a recognized and current Product Certification Scheme at the time of purchase. These schemes assess and verify the TVOC content of the materials, ensuring they meet the specified limits.
2. Laboratory Product Testing: If there are no certified products available, the contractor can conduct laboratory testing on the paints, adhesives, sealants, and carpets to determine their TVOC content. The testing should be carried out using the whole paint, including water and tinters, to obtain accurate results.
3. Absence of Non-compliant Materials: Alternatively, if none of the materials mentioned (paints, adhesives, sealants, and carpets) are present at the time of practical completion (PC), and thus no TVOC emissions are expected, compliance can be achieved.

All paints used for internal application on the job are to have a low TVOC content as outlined below. TVOC content must be based on whole paint (water and tinters included):





Table 12: Paint VOC limits

| PRODUCT TYPE / SUBCATEGORY           | MAX TVOC CONTENT (G/L OF READY TO USE PRODUCT) |
|--------------------------------------|--|
| Walls and ceilings – Any gloss level | 16   |
| Trim, varnishes and wood stains      | 75   |
| Primers, sealers and prep coats      | 65   |

Maximum TVOC Content Limits for Paints, Varnishes and Protective Coatings

\*EU Directive

The TVOC content of the ‘ready-to-use’ paint shall be theoretically calculated as the sum total of the VOCs of each of the raw material component comprising the paint.

Where the TVOC content of individual components is not known, it must be determined experimentally by one of the following testing methods as appropriate:

- ISO Method 17895 (2005), for a material with a presumed VOC content <1%;
- ISO Method 11890-2 (2006), for a material with a presumed VOC <15%;
- ISO Method 11890-1 (2007), for a material with a presumed VOC content >15%;
- ASTM D3960, which is comprised of four individual testing procedures that measures TVOC (D2369) as well as density (D1475) and water content (D4017). Exempt compounds (D4457) must not be subtracted in the calculation of VOC content.

The contractor must obtain written approval from the design team before using any sealant, adhesive, paint, flooring or fit out items. This approval will be contingent on the provision of proof that the product has a VOC content below that noted above.

At the end of construction, the contractor is required to undertake a final audit to ensure that the correct products have been used.

All sealants used in an internal application on the job are to have a low TVOC content as outlined below.

Table 13: Adhesives/Sealants VOC limits

| PRODUCT  | MAXIMUM TVOC CONTENT (G/LITRE) |
|--|--------------------------------|
| General purpose adhesives and sealants   | 50                             |
| Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives | 250                            |
| Structural glazing adhesive, wood flooring and laminate adhesives and sealants                                       | 100                            |
| Primers, sealers and prep coats  | 65                             |
| One and two pack performance coatings for floors   | 140                            |





Maximum TVOC limits for Adhesives & Sealants

\*Sealants used to enhance the fire- and water-proofing properties are included.

The testing method applicable to adhesive and sealants is only ASTM D3960 as detailed above for paints. For more information on ASTM D3960 refer to South Coast Air Quality Management District Rule 1168.

The contractor must obtain written approval from the design team before using any sealant, adhesive, paint, flooring or fitout items. This approval will be contingent on the provision of proof that the product has a VOC content below that noted above.

At the end of construction, the contractor is required to undertake a final audit to ensure that the correct products have been used.

All carpets and/or other flooring used on the project are to have low TVOC emission rates as outlined below.

Table 14: Carpet VOC limits

| ALL CARPET/FLOORING PRODUCTS MUST COMPLY WITH TVOC EMISSION LEVELS |                                 |
|--|---------------------------------|
| Total VOC limit  | 0.5 mg/m <sup>2</sup> per hour  |
| 4-pc (4-Phenolcyclohexene) limit                                   | 0.05 mg/m <sup>2</sup> per hour |

Compliance Testing: Refer to Carpet and Rug Institute Green Label (US) OR American Society for Testing and Materials (ASTM) D5116 Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Material/Products OR

For carpets and laminate floor coverings, an option for demonstrating compliance with TVOC levels is as follows: ISO 10580 (also known as ISO/TC 219) – Document N238 – Resilient,

Textile and Laminate Floor Coverings Evaluation of Volatile Organic Compounds Emissions, with a limit of 500µg/m<sup>2</sup>/hr at 24 hours. OR

For floor coverings (other than carpet), an option for demonstrating compliance with TVOC levels is as follows:

ISO16000 parts 9, 10 and 11 (also known as the EN 13419), with a TVOC limit at three days of 5mg/m<sup>2</sup>/h and 0.5mg/m<sup>2</sup>/h at 28 days.

Carpet or other flooring installed as part of the base building works prior to fit out works, can be deemed re-used for the purpose of this credit.

The contractor must obtain written approval from the design team before using any sealant, adhesive, paint, flooring or fit out items. This approval will be contingent on the provision of proof that the product has a VOC content below that noted above.

At the end of construction, the contractor is required to undertake a final audit to ensure that the correct products have been used.





There are two options for demonstrating compliance for carpets, as follows:

Option A - Product Certification:

Carpets certified under a relevant Product Certification Scheme standard recognised by the GBCA under the GBCA assessment Framework for Product Certification Schemes are deemed to satisfy the requirements of this criterion. Relevant GBCA recognized standards are listed on the GBCA web site. The certificate must be current at the time of project registration or submission and list the relevant product name and model.

A UL GREENGUARD Children & Schools® certification current at the time of project registration or submission is another acceptable evidence for demonstrating compliant TVOC levels for carpets.

Option B - Experimental Testing

All carpets comply with the Total VOC (TVOC) limits within Table below. The emission levels detailed in this table must be established by a NATA or another ISO/IEC17025 accreditation laboratory.

Table 15: Flooring VOC limits

| ALL CARPET/FLOORING PRODUCTS MUST COMPLY WITH TVOC EMISSION LEVELS – TO ASTM D5116 TEST PROTOCOL |                                 |
|--|---------------------------------|
| Carpets using ASTM D5116 Test Protocol:  |                                 |
| Total VOC limit  | 0.5 mg/m <sup>2</sup> per hour  |
| 4-pc (4-Phenolcycohexene) limit  | 0.05 mg/m <sup>2</sup> per hour |
| Carpet using ISO 16000 test protocol (also known as EN 13419)                                    |                                 |
| TVOC at three days-  | 0.5 mg/sqm per hour             |
| Flooring using ISO 10580 (also known as ISO/TC 219) – Document                                   |                                 |
| TVOC at 24 hours - 0   | 0.5mg/sqm per hour              |

### 10.2 FORMALDEHYDE MINIMISATION

All engineered wood products used internally, including exposed and concealed applications, must have low formaldehyde emissions as defined in the table below, or contain no formaldehyde. Engineered wood products are defined as particleboard, plywood, veneer, MDF, Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels and include both finished and unfinished products.

These requirements are not applicable to exterior applications, formwork, internal car park applications, reused engineered wood products or raw timber.

The contractor must obtain approval from the design team before substituting any product.







The limits listed here are defined according to the test method. The levels listed are equivalent results for different test procedures.

Table 16: Formaldehyde emission limits

| TEST PROTOCOL   | EMISSION LIMIT/ UNIT OF MEASUREMENTS  |
|---|---|
| AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood   | < 1.0 mg/L  |
| AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16  | < 1.5 mg/L  |
| AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16   | < 1.0 mg/L  |
| JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460   | < 1.0 mg/L  |
| JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460   | < 1.0 mg/L  |
| JIS A1901 (not applicable to Plywood)   | < 1.0 mg/L  |
| ASTM D5116  | <0.1 (+/- 0.0005) mg/m <sup>2</sup> hr (may also be represented as mg/m <sup>2</sup> /hr) |
| ISO 16000 part 9, 10 and 11 (also known as EN 13419)  | <0.1 (+/- 0.0005) mg/m <sup>2</sup> hr (may also be represented as mg/m <sup>2</sup> /hr) |
| ASTM D6007  | 0.12mg/m <sup>3</sup> *   |
| ASTM E1333  | 0.12mg/m <sup>3</sup> **  |
| EN 717-1 (also known as DIN EN 717-1)   | 0.12 mg/m <sup>3</sup>  |
| EN 717-2 (also known as DIN EN 717-2)   | 3.5 mg/m <sup>2</sup> hr (may also be represented as mg/m <sup>2</sup> /hr).              |
| *The test report must confirm that the conditions of Table 1 comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98. |   |

\*\* The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.





## 11 CONCLUSION

In conclusion, the presented report provides a comprehensive overview of sustainability commitments that harmonize seamlessly with the core principles of the sustainability philosophy. These initiatives centre around the critical areas of energy conservation, water conservation, and waste reduction, showcasing a concerted effort to create a more environmentally responsible and resource-efficient approach. By prioritising these fundamental aspects, the report underscores a commitment to fostering a greener and more sustainable future.

Table 17: Sustainability Commitments

| DESCRIPTION              | GOAL  | SUSTAINABILITY COMMITMENTS  |
|--------------------------|---|---|
| CLEAR AIR                | Improve indoor environment quality and health and wellbeing of occupants. | Outdoor air provided to primary areas at a rate at least <b>50%</b> greater than minimum in AS 1668.2:2012. <i>(TBC based on mechanical consultant).</i>  |
| LIGHT QUALITY            |   | Above <b>40%</b> of the regularly occupied areas have high level of daylight (above 160 Lux).   |
| EXPOSURE TO TOXINS       |   | The building's paints adhesives, sealants, and carpets are low in TVOC or non-toxic.<br>The building's engineered wood products are low in TVOC or non-toxic.<br>Occupants are not exposed to banned or highly toxic materials in the building. |
| HEAT RESILIENCE          | Reduce impacts of long-term performance.                                  | Light Roof Colour (SRI below 0.50)  |
| ENERGY USE               | Reduce emissions and water use.   | A minimum of <b>30%</b> offset in operational energy usage  |
| WATER USE                |   | High WELS Ratings (these equal to above <b>30%</b> reduction in potable water).   |
| LIGHTING USE             |   | <b>20%</b> reduction in lighting power when compared to NCC DTS.  |
| MOVEMENT AND PLACE       | Low carbon options.   | Provision for 2x EV Charging Bays   |
| DESIGN FOR INCLUSION     | Social health.  | Disability Access and inclusive design  |
| BIODIVERSITY ENHANCEMENT | Improved Nature outcomes.   | Plant additional local native trees on the site to further shade the outdoor areas and structures.<br>Climate Resilience, drought tolerant planting.  |

