CUNDALL

Tuesday, 14 September 2010

128 Herring Rd, Building A

Macquarie Park, NSW

ESD Performance Statement

Prepared for

Lipman Pty Ltd

CUNDALL

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A	External Issue	08/09/10
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The success and realisation of the proposed initiatives will be dependant upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved

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1 Introduction

This document provides a summary of the proposed ESD strategies being targeted to achieve a 4 star Green Star performance under the Green Building Council of Australia's Multi-Unit Residential v1 tool for Building A.

These strategies go beyond the minimum performance requirements of BASIX to demonstrate the project's commitment to environmentally sustainable design.

It is intended that a similar strategy will be adopted for each remaining building B,C,D and E as designs for these buildings are developed.

2 Proposed ESD Initiatives

2.1 Building Fabric

The building fabric design balances a number of performance criteria:

- Cost
- Aesthetic
- Natural light penetration to improve indoor environment quality and reduce electric lighting energy use
- External shading and solar performance of glazing to reduce cooling energy use
- Thermal performance to balance thermal gains and losses through the fabric
- Glare control to provide visual comfort for occupants
- Modular design for disassembly.

As such, the facade is designed to meet the following performance requirements:

Shading	• Vertical shade screens & horizontal elements as per drawings
External Walls	• 190mm Precast Concrete + Insulation R 2.5
Internal Wall/Internal Space	• Plasterboard + Concrete + Plasterboard
Internal Wall/Common Area	• Plasterboard + Insulation R 1.0 + Concrete
Glazing	• 'Comfort Plus' laminate glazing where specified in Appendix A [U Value=3.6 W/m2K; SHGC=0.51; VLT=59%] • Single Clear Glazing where laminate glazing is not specified [U Value=5.4 W/m2K; SHGC=0.70; VLT=82%]
Floors	• Living & Bedrooms: 200mm Concrete Slab + Carpet; Bathrooms & Kitchens: 200mm Concrete Slab + Tiles
Ceiling	• Plasterboard
Roof	• Insulation R 3.0 + 300mm Concrete Slab

2.2 Architectural ESD Features

The current architectural design targets compliance with Green Star credit criteria for the following credits:

- **IEQ-5 Thermal Comfort & ENE-12 Peak Demand Reduction** - through building fabric optimisation, Building A will achieve an average annual total heating and cooling load of 30MJ/m2, with most of the apartments achieving an 8 Star NatHERS rating. More details are provided in Appendices A and B.
- **IEQ-8 Volatile Organic Compounds** – Paints and Coatings will be specified to comply with the limits set by GBCA criteria (contained in Appendix C).
- **IEQ-8 Volatile Organic Compounds** – Sealants and Adhesives will be specified to comply with the limits set by GBCA criteria (contained in Appendix C).
- **IEQ-8 Volatile Organic Compounds** – Carpets will be specified to comply with the limits set by GBCA criteria (contained in Appendix C).
- **IEQ-8 Volatile Organic Compounds** – there will be no wall or ceiling coverings (ie. fixed with an adhesive)
- **IEQ-9 Formaldehyde Minimisation** – Engineered wood products will be specified to comply with the limits set by GBCA criteria (contained in Appendix C).
- **TRA-2 Fuel Efficient Transport**
  - 10% of all parking spaces are designed for small cars and 5% for motorcycles
- **TRA-3 Cyclist Facilities**
  - One enclosed cycle cage per apartment will be provided
  - One visitor cycle rack will be provided per 4 apartments in an accessible on-grade location, signposted and near a major public entrance
- **WAT-1 Occupant Amenity Potable Water Efficiency**
  - Efficient tapware will be specified as follows:
    - Minimum 4 Star WELS rated taps (max. 6L/min)
    - Minimum 4 Star WELS rated toilets (max. 3.5L/flush)
    - Minimum 3 Star WELS rated showerheads (max. 9L/min)
    - Minimum 4 Star WELS rating for dishwashers
- **MAT-1 Recycling Waste Storage**
  - A dedicated basement storage area has been designed for the separation and collection of recyclables (accessible to recycling contractors)
  - The area is adequately sized to accommodate the storage equipment for the following as a minimum: cardboard, glass, plastics (mixed containers, soft plastics and polystyrene), batteries and metals

- A dedicated storage area large enough to contain a $2m^3$ cage for large household item reuse will be located next to the recycling area.
- Recycling will be as convenient as throwing away general waste; i.e. next to general waste chutes will be recycling storage cupboards or chutes

- **MAT-8 Sustainable Timber**
  - All timber used in the design will be sourced from sustainable sources such as plantations (FSC certified) or reused from post-consumer recyclers.
- **MAT-15 Universal Design**
  - At least 10% of apartments have been designed as adaptable.
- **EMI-4 Insulant ODP**
  - 100% of insulants will have an Ozone Depletion Potential (ODP) of zero
- **ECO-3 Outdoor Communal Facilities**
  - The following outdoor communal facilities will be provided to encourage social interaction and physical activity:
    - 25% of the landscaped area will be for open communal play
    - 25% of the outdoor communal facilities will have shading
    - BBQ Facilities
    - Swimming pool
    - Outdoor dining
    - Quiet Seating
- **IEQ-7 Internal Noise Levels**
  - Ambient internal noise levels from building services and external sources will not exceed:
    - 35dBAeq (1 hour) in any bedroom between 10pm-7am) and
    - 40dBAeq (1 hour) in any other habitable rooms at any time

Additionally as part of the O&M manual, consideration will be given to best practice environmentally responsible materials for replacement/repair.

2.3 Electrical

A high efficiency electrical design satisfies the Green Star criteria for the following credits:

- **MAN-2 Commissioning Clauses**
- **MAN-3 Building Tuning**
- **MAN-16 Metering**

- Water meters to be provided for base building major uses
- Electricity meters to be provided for base building major uses
- Individual apartment meters to be provided for electricity, central hot water, cold water and gas

- **IEQ-13 Electric Lighting Levels**
  - Lux levels to be 300 above sinks, basins and cook tops
- **ENE-7 Unoccupied Areas**
  - Lobbies will be naturally ventilated
  - All common areas will have lighting and ventilation (where applicable) connected to motion sensors and time clocks to minimise energy use
- **ENE-1 Greenhouse Gas Emissions**
  - 20kW of Photovoltaic electricity generating panels will be considered to boost the energy efficiency of the building as a whole
- **EMI-7 Light Pollution**
  - External lighting will be designed to avoid light being directed upwards such that no light beam, generated from within the building or outside of the building boundary, is directed at any point in the sky hemisphere without falling directly onto a non-transparent surface.
  - The design will comply with AS4282 “Control of the Obtrusive Effects of Outdoor Lighting” and 95% of outdoor spaces will not exceed the minimum requirements of AS1158 for illuminance levels.

2.4 Mechanical

A high efficiency mechanical design satisfies the Green Star criteria for the following credits:

- **MAN-2 Commissioning Clauses**
- **MAN-3 Building Tuning**
- In contribution to **ENE-1 (Greenhouse Gas Emission Reduction)**, consideration will be given to maximising the energy efficiency of ancillary components of the mechanical system such as fans, pumps, etc.
- **EMI-1 Refrigerant ODP**
  - 100% of refrigerants will have an Ozone Depletion Potential (ODP) of zero
- **WAT-4 Heat Rejection Water & EMI-8 Legionella**
  - No water will be used for heat rejection

2.5 Hydraulics

A water efficient hydraulic design satisfies the Green Star criteria for the following credits:

- **MAN-2 Commissioning Clauses**
- **MAN-3 Building Tuning**
- **WAT-3 Landscape Irrigation**
  - Rainwater will be captured from the roof and stored to supply more than 90% of irrigation requirements
- **WAT-5 Fire System Water Consumption**
  - Sufficient temporary storage will be provided for a minimum of 80% of the routine fire protection system test water and maintenance drain-downs, for reuse on-site
  - On-floor isolation valves will be installed to minimise test water use in operation
- **WAT-8 Swimming Pool Water Efficiency**
  - A pool blanket will be provided to prevent evaporation loss
  - Potable water consumption will be reduced by 70% through a combination of:
    - Efficient filtration
    - Backwash reuse and/or
    - Non-potable top-up from the rainwater tank

2.6 Structural/Civil

The structural and civil design satisfies the Green Star criteria for the following credits:

- **MAT-4 Concrete**
  - A proportion of cement will be replaced with an industrial waste product (at least 60% for in-situ concrete, 40% for precast concrete and 30% for stressed concrete), reducing the embodied energy impacts of Portland cement production
  - 20% of all aggregate used for structural purposes will be recycled (Class 1 RCA in accordance with HB155-2002) or slag aggregate; and no natural aggregates will be used in non-structural uses (e.g. building base course, sub-grade to any car parks and footpaths, backfilling to service trenches, kerb and gutter)
- **MAT-5 Steel**
  - Pending availability, a target of 60% of all steel, by mass, will have a post-consumer recycled content greater than 50%

- **EMI-5 Watercourse Pollution**
  - Stormwater will be detained such that the development does not increase peak stormwater flows compared to the pre-development site for rainfall events of up to a 1-in 2 year storm;
  - All stormwater leaving the site, at any time up to a 1-in-20 year storm event, will be treated or filtered in accordance with either:
    - CSIRO Urban Stormwater: Best Practice Environmental Management Guidelines; or
    - Australian and New Zealand Environment Conservation Council (ANZECC)'s Guidelines for Urban Stormwater Management.

2.7 Construction & Operational Management

The head contractor, commissioning agent and facilities management will be required to ensure that the construction and operational management will achieve high levels of performance for environmental management to satisfy the following credits:

- **MAN-2 Commissioning Clauses**
  - Comprehensive pre-commissioning, commissioning, and quality monitoring are to be contractually required to be performed for all building services (BMS, mechanical, electrical and hydraulic); and the works completed in exact accordance with CIBSE Commissioning Codes or ASHRAE Commissioning Guideline 1-1996 (for mechanical services only); and
  - The design team and contractor are required to 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; and
    - Training of building management staff
- **MAN-3 Building Tuning**
  - After handover, the building owner must implement tuning of all building systems; and a relevant member of the design team is involved in the tuning process.
  - Monthly monitoring must be undertaken and the outcomes are reported to the building owner quarterly
  - Full re-commissioning is to be undertaken 12 months after practical completion
  - A Building Tuning Report on the outcomes of the tuning process is to be provided to the building owner and made available to the design team.
- **MAN-4 Independent Commissioning Agent**
  - An independent commissioning agent will provide commissioning advice to the building owner and the design team as well as monitor and verify the commissioning of all building systems.
- **MAN-5 Building User's Guide**
  - A simple and easy-to-use Building Users' Guide, which includes information relevant for the building users, occupants and tenants' representatives, will be developed and made available to the building owner.
- **MAN-6 Environmental Management**
  - The head contractor is to implement a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with Section 4 of the NSW Environmental Management System guidelines 1998 or 2007; and
  - The head contractor must have valid ISO 140001 Environmental Management System (EMS) accreditation prior to and throughout the project.
- **MAN-7 Waste Management**
  - More than 80% of demolition and construction waste will be recycled.

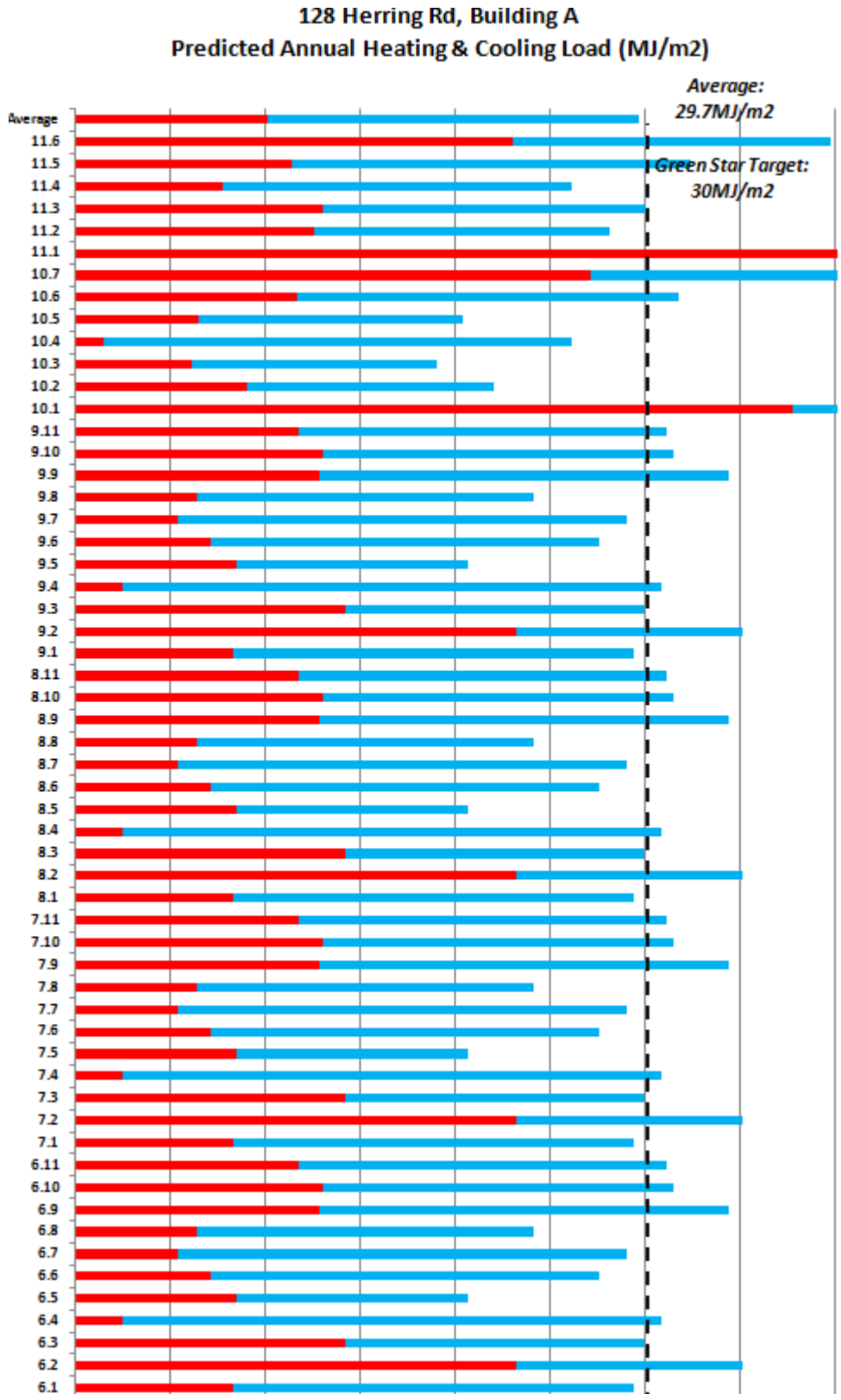
Appendix A – Facade Performance Summary

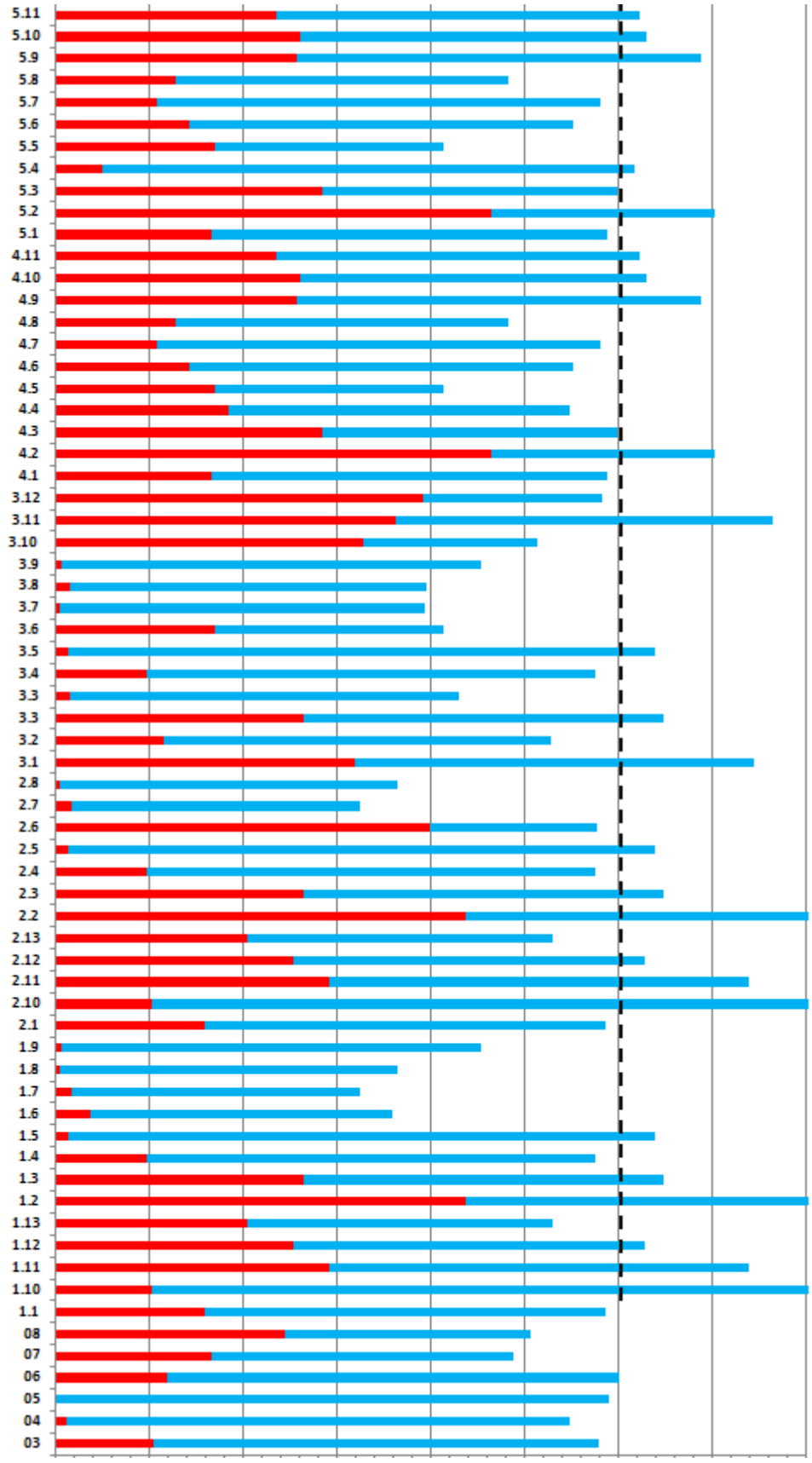
The table below indicates the modifications required beyond BASIX compliance to achieve the IEQ-5 requirement. A '1' indicates a slight glazing reduction in selected areas and a '2' indicates a laminated glass is required for the entire apartment.

03	5.2	23.7	28.9	
04	0.6	26.8	27.4	
05	0.0	29.5	29.5	2
06	6.0	24.0	30.0	2
07	8.3	16.1	24.4	2
08	12.2	13.1	25.3	2
1.1	8.0	21.3	29.3	2
1.10	5.1	42.9	48.0	2
1.11	14.6	22.3	36.9	2
1.12	12.7	18.7	31.4	2
1.13	10.2	16.3	26.5	2
1.2	21.8	25.0	46.8	2
1.3	13.2	19.2	32.4	2
1.4	4.9	23.8	28.7	2
1.5	0.7	31.2	31.9	2
1.6	1.9	16.0	17.9	2
1.7	0.9	15.3	16.2	2
1.8	0.2	18.0	18.2	2
1.9	0.3	22.4	22.7	2
2.1	8.0	21.3	29.3	2
2.10	5.1	42.9	48.0	2
2.11	14.6	22.3	36.9	2
2.12	12.7	18.7	31.4	2
2.13	10.2	16.3	26.5	2
2.2	21.8	25.0	46.8	2
2.3	13.2	19.2	32.4	2
2.4	4.9	23.8	28.7	2
2.5	0.7	31.2	31.9	2
2.6	19.9	8.9	28.8	2
2.7	0.9	15.3	16.2	2
2.8	0.2	18.0	18.2	2
3.1	15.9	21.3	37.2	2
3.2	5.8	20.6	26.4	2
3.3	13.2	19.2	32.4	2
3.3	0.8	20.7	21.5	2
3.4	4.9	23.8	28.7	2
3.5	0.7	31.2	31.9	2
3.6	8.5	12.2	20.7	1
3.7	0.2	19.5	19.7	2
3.8	0.8	19.0	19.8	2
3.9	0.3	22.4	22.7	2
3.10	16.4	9.3	25.7	2
3.11	18.1	20.1	38.2	2
3.12	19.6	9.5	29.1	2
4.1	8.3	21.1	29.4	1,2
4.2	23.2	11.9	35.1	1,2
4.3	14.2	15.7	29.9	1,2
4.4	9.2	18.2	27.4	
4.5	8.5	12.2	20.7	1
4.6	7.1	20.5	27.6	1
4.7	5.4	23.6	29.0	1
4.8	6.4	17.7	24.1	1
4.9	12.9	21.5	34.4	2
4.10	13.0	18.5	31.5	1,2
4.11	11.8	19.3	31.1	2
5.1	8.3	21.1	29.4	1,2
5.2	23.2	11.9	35.1	1,2
5.3	14.2	15.7	29.9	1,2
5.4	2.5	28.3	30.8	2
5.5	8.5	12.2	20.7	1
5.6	7.1	20.5	27.6	1
5.7	5.4	23.6	29.0	1
5.8	6.4	17.7	24.1	1
5.9	12.9	21.5	34.4	2
5.10	13.0	18.5	31.5	1,2
5.11	11.8	19.3	31.1	2
6.1	8.3	21.1	29.4	1,2
6.2	23.2	11.9	35.1	1,2
6.3	14.2	15.7	29.9	1,2
6.4	2.5	28.3	30.8	2
6.5	8.5	12.2	20.7	1
6.6	7.1	20.5	27.6	1
6.7	5.4	23.6	29.0	1
6.8	6.4	17.7	24.1	1
6.9	12.9	21.5	34.4	2
6.10	13.0	18.5	31.5	1,2
6.11	11.8	19.3	31.1	2
7.1	8.3	21.1	29.4	1,2
7.2	23.2	11.9	35.1	1,2
7.3	14.2	15.7	29.9	1,2
7.4	2.5	28.3	30.8	2
7.5	8.5	12.2	20.7	1
7.6	7.1	20.5	27.6	1
7.7	5.4	23.6	29.0	1
7.8	6.4	17.7	24.1	1
7.9	12.9	21.5	34.4	2
7.10	13.0	18.5	31.5	1,2
7.11	11.8	19.3	31.1	2
8.1	8.3	21.1	29.4	1,2
8.2	23.2	11.9	35.1	1,2
8.3	14.2	15.7	29.9	1,2
8.4	2.5	28.3	30.8	2
8.5	8.5	12.2	20.7	1
8.6	7.1	20.5	27.6	1
8.7	5.4	23.6	29.0	1
8.8	6.4	17.7	24.1	1
8.9	12.9	21.5	34.4	2
8.10	13.0	18.5	31.5	1,2
8.11	11.8	19.3	31.1	2
9.1	8.3	21.1	29.4	1,2
9.2	23.2	11.9	35.1	1,2
9.3	14.2	15.7	29.9	1,2
9.4	2.5	28.3	30.8	2
9.5	8.5	12.2	20.7	1
9.6	7.1	20.5	27.6	1
9.7	5.4	23.6	29.0	1
9.8	6.4	17.7	24.1	1
9.9	12.9	21.5	34.4	2
9.10	13.0	18.5	31.5	1,2
9.11	11.8	19.3	31.1	2
10.1	37.7	15.0	52.7	2
10.2	9.0	13.0	22.0	2
10.3	6.1	12.9	19.0	2
10.4	1.5	24.6	26.1	
10.5	6.5	13.9	20.4	2
10.6	11.7	20.0	31.7	2
10.7	27.1	16.1	43.2	2
11.1	44.0	16.8	60.8	2
11.2	12.6	15.5	28.1	2
11.3	13.0	17.0	30.0	2
11.4	7.8	18.3	26.1	2
11.5	11.4	21.0	32.4	1,2
11.6	23.0	16.7	39.7	1,2
Average	10.1	19.6	29.7	

Appendix B – Thermal Comfort Performance Summary

The chart below indicates the predicted annual heating and cooling loads for each apartment.

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Appendix C – IEQ-8&9 Performance Requirements

- **IEQ-8 Volatile Organic Compounds** – Paints and Coatings will be specified to comply with the following limits set by GBCA criteria

Paints & Coatings must comply with ASTMD3960	
Product Type	**Maximum VOC Content (g/litre)**
Interior Semi Gloss	16
Interior Low Sheen	16
Interior Flat Washable	16
Ceilings Interior	14
Exterior Gloss	75
Trim - gloss, semi gloss, satin, varnishes & wood stains	75
Timber and binding primers	30
Latex primer for galvanised iron and zincalume	60
Interior Latex undercoat	65
Interior Sealer	65
Interior Sealer	65
One and two pack performance coatings for floors	140
Other solvent based coatings	200

- **IEQ-8 Volatile Organic Compounds** – Sealants and Adhesives will be specified to comply with the following limits set by GBCA criteria

Adhesives & Sealants must comply with South Coast Air Quality Management District Rule 1168	
Product Type	**Maximum VOC Content (g/litre)**
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 & panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Architectural sealants	250

- **IEQ-8 Volatile Organic Compounds** – Carpets will be specified to comply with the following limits set by GBCA criteria

Carpets must comply with Carpet & Rug Institute Green Label or ASTM D5116		
Product Type	**Maximum VOC Emission (mg/m²/hr)**	**Maximum 4-PC Emission (mg/m²/hr)**
All carpet products	0.5	0.05

- **IEQ-8 Volatile Organic Compounds** – there will be no wall or ceiling coverings (ie. fixed with an adhesive)

- **IEQ-9 Formaldehyde Minimisation** – Engineered wood products will be specified to comply with the following limits set by GBCA criteria

Engineered Wood Products				
Product Type	**Formaldehyde Emission Limit (E1)**	**Formaldehyde Emission Limit (E0)**	**Formaldehyde Emission Limit (Super E0)**	**Applicable Testing Method**
Plywood	1.0 mg/L	0.5 mg/L	0.3 mg/L	AS 2098.11
Particle Board	1.0 mg/L	0.5 mg/L	0.3 mg/L	AS 4266.16
MDF	1.5 mg/L	0.5 mg/L	0.3 mg/L	AS 4266.16
Plywood	6 mg / 100 g	4 mg / 100 g	2.4 mg / 100 g	EN 120
Particle Board	9 mg / 100 g	6 mg / 100 g	2.8 mg / 100 g	EN 120
MDF	9 mg / 100 g	6 mg / 100 g	2.8 mg / 100 g	EN 120
Plywood	0.12 mg/m3h	0.08 mg/m3h	0.04 mg/m3h	DIN EN 717-1
Particle Board	0.12 mg/m3h	0.08 mg/m3h	0.04 mg/m3h	DIN EN 717-1
MDF	0.12 mg/m3h	0.08 mg/m3h	NA	DIN EN 717-1