16/05/2013

s.75W ESD Report

1006537 23-37 Lindfield Ave

Prepared for:

ANKA

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A	S75W Draft	13/11/2012
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The success and realisation of the proposed initiatives will be dependent 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.

Contents

Executive Summary

The proposed residential development at 23 – 37 Lindfield Ave, Lindfield has committed to a high level of environmental performance.

The following ESD review assesses the proposed site according to three sustainability tools which regulate residential properties, namely;

- BASIX, a planning tool which calculates energy and water efficiency and sets minimum thermal performance requirements;
- NatHERS, which calculates a star rating based on predicted space heating and cooling loads and
- SEPP 65; the State Environmental Planning Policy regulating the design quality of residential flat development in terms of solar access and natural ventilation.

In addition, the retail components have been assessed for compliance under BCA Section J1 Building Fabric and J2 Glazing.

The following tables identify the compliance of the development with these tools;

BASIX and NatHERS targets;

Environmental Impact Category	NSW BASIX Minimum Target	% Achieved	Compliant?
Water Savings	40%	41%	✓
Energy Savings	20%	20%	✓
Thermal Comfort (NatHERs)	Pass	Pass	✓

SEPP65 targets;

SEPP 65 Criteria	SEPP 65 target	% Achieved	Compliant?
Living rooms and private open spaces should receive a minimum of 2 hours direct sunlight between 9am-3pm in mid-winter, for at least 70% of apartments.	70%	70%	✓
Maximum number of southerly single-aspect apartments is 10%	10%	0%	✓
60% of units should be naturally cross-ventilated	60%	64%	✓

BCA Section J1 and J2;

The minimum thermal performance requirements for the following building constructions are summarised in Section 4 of this report;

- Roof / ceiling insulation (J1.3)
- Roof lights (J1.4)
- Wall insulation (J1.5)
- Floor insulation (J1.6)
- Glazing performance (J2)

1. Introduction

NSW regulation requires the residential class 2 portion of 23-37 Lindfield Ave to be assessed under the following two tools;

- BASIX (NatHERs for thermal comfort)
- SEPP65

In addition, the fabric and glazing of the retail areas must comply with the requirements of BCA Section J1 and J2 respectively.

This report details the NSW regulatory requirements of BASIX, SEPP65 and BCA Section J1 and J2 for the development and the strategies employed to achieve compliance.

1.1 BASIX Targets

23 - 37 Lindfield Avenue, Lindfield is located in NatHERs climate zone 56 and is required by NSW regulation to achieve the following BASIX targets for energy, water and thermal comfort;

Environmental Impact Category	NSW BASIX Minimum Target
Water Savings	40%
Energy Savings	20%
Thermal Comfort	Pass

Energy and water targets represent a percentage saving compared to a NSW average benchmark. Thermal comfort targets are a pass/fail measure and are assessed using second generation NatHERs approved thermal modelling software to estimate each dwellings performance against climate specific heating and cooling load limits.

1.2 SEPP 65 Targets

In addition to BASIX, the following SEPP-65 criteria are applicable to the development;

SEPP 65 Criteria	SEPP-65 Target
Living rooms and private open spaces should receive a minimum of 2 hours direct sunlight between 9am-3pm in mid-winter, for at least 70% of apartments.	70%
Maximum number of southerly single-aspect apartments is 10%	10%
60% of units should be naturally cross-ventilated	60%

Solar access modelling has been conducted to determine the direct sunlight into each apartment during the winter solstice and a cross ventilation analysis has been conducted based on the location and orientation of operable windows in each apartment.

2. BASIX

2.1 Water Efficiency

The BASIX water strategy for the site utilises water efficient sanitary fixtures to reduce water consumption throughout the development. The utilisation of efficient fixtures will not only reduce sanitary water consumption, but in turn also reduces the wastewater to be discharged to the sewerage system.

Further potable-water savings are achieved through the utilisation of rainwater for landscape irrigation.

Proposed strategies to achieve the BASIX water target of 40% reduction in potable water consumption are outlined in the table below:

BASIX Base Case	Water Conservation Strategies
Fixtures[1]	• Efficient fixtures including • 3-Star showerheads (<7.5L/min); • 5-Star kitchen and bathroom wash hand basin; and • 4-Star dual-flush toilets.
Appliances	• 4 Star WELS rated Dishwashers. • Clothes washers not specified
Common Areas	• 32.486kL rainwater storage for landscape irrigation and car washing bay • Fire Sprinkler test water is contained in a closed loop
BASIX Water Target	**40%**
BASIX Water Score	**41%**
Compliant?	✓

[1] More information on water efficient appliances can be found at www.waterrating.gov.au

2.2 Energy Efficiency

Strategies to achieve the BASIX energy target of 20% reduction in energy consumption are outlined in the following table:

BASIX Base Case	Energy Conservation Strategies
Common Areas	• Variable Speed Drive (VSD) car park ventilation with carbon monoxide sensors (supply and exhaust) • Mechanical ventilation to service/plants, switch rooms and garbage rooms (exhaust only) • Mechanical ventilation to hallways and lobbies with time clock controls. (supply only) • Fluorescent lighting with motion sensors to all common areas including (but not limited to) car park, garbage rooms, lobby/stairways, service/plants and switch rooms. • LED lighting to lift car, connected to call buttons • Residential lifts - Gearless traction with VVVF motor
Appliances	• Gas cooktop and electric oven • 4 Star dishwashers • 2 Star clothes dryers • No refrigerators specified
Domestic Hot Water	• Central Gas-fired boiler with R1.0 pipe insulation
Air-conditioning and ventilation	• 1.5 Star (1-phase) heating and cooling to living rooms and bedrooms • Ceiling fans to living rooms and bedrooms • Kitchen exhaust, individual fan ducted to facade (manual on/off switch) • Bathroom exhausts, individual fan ducted to facade (interlocked to light) • Laundry exhausts, individual fan ducted to facade (manual on/off switch)
Lighting	• Dedicated LED or Fluorescent lighting throughout dwellings
BASIX Energy Target	**20%**
BASIX Energy Score	**20%**
Pass?	✓

2.3 Thermal Comfort

The thermal properties of the building fabric have been chosen to achieve thermal comfort within the dwellings for the greatest percentage of the year. In the Eastern Sydney climate zone (56) in which the building resides, consideration must be given to reducing both heating and cooling loads to ensure thermal comfort in summer and winter months.

The table below identifies the fabric and thermal properties of the building elements modelled in the NatHERs assessment to achieve the thermal comfort targets specified by BASIX.

Building Envelope Requirements	
Construction & shading	• As indicated on the architectural drawings
External Wall	• 200mm Concrete + R1.5 insulation + plasterboard
Internal Walls	• Plasterboard on Stud (internal apartment) • ACC + plasterboard (party walls)
Roof	• 200mm Concrete + R3.0 insulation + plasterboard ceiling
Floor	• 200mm Concrete slab + carpet/tile • 200mm Concrete slab + R1.0 + carpet/tile (above car parks)
Glazing	• single low-e: U 4.75 SHGC 0.45*
BASIX Target	Average Thermal Load: Heating 51MJ/m^2 Cooling 45MJ/m^2
Lindfield Score	Average Thermal Load: Heating 28.8MJ/m^2 Cooling 21.1MJ/m^2
Compliant?	✓

* All U-values and SHGC values are based on AFRC figures and are figures for total glazing including frames.

3. SEPP 65

SEPP 65 planning guidelines apply to the development and set targets for cross ventilation and solar access in new multi-unit residential developments.

The SEPP-65 criteria are:

- Living rooms and private open spaces should receive a minimum of 2 hours direct sunlight between 9am-3pm in mid-winter, for at least 70% of apartments.
- Maximum number of southerly single-aspect apartments is 10%
- 60% of units should be naturally cross-ventilated with recommended maximum building depth: 10-18m (unless natural ventilation can be otherwise demonstrated)

SEPP 65 Requirement	% Achieved	Compliant?
Living rooms and private open spaces should receive a minimum of 2 hours direct sunlight between 9am-3pm in mid-winter, for at least 70% of apartments.	70%	✓
Maximum number of southerly single-aspect apartments is 10%	0%	✓
60% of units should be naturally cross-ventilated with recommended maximum building depth: 10-18m	64%	✓

3.1 Solar Access

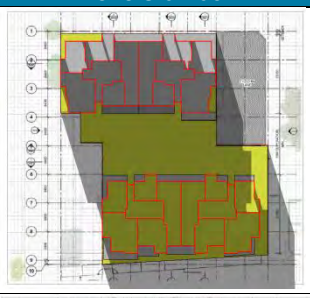
The solar access requirements are:

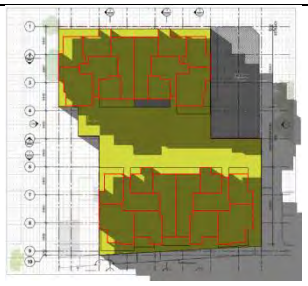
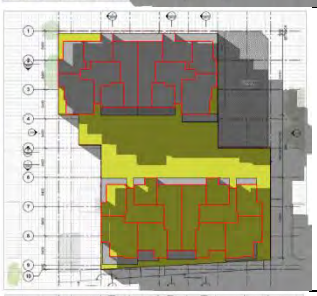
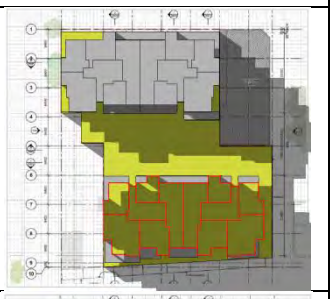
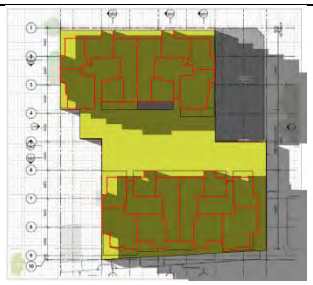
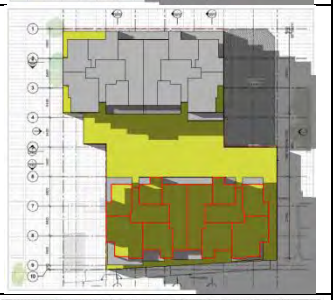
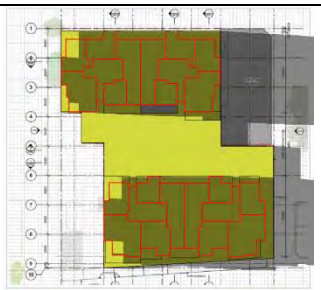
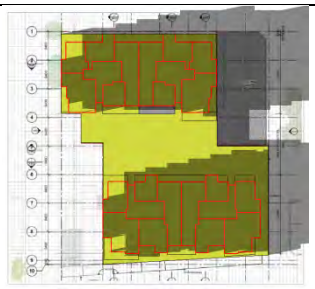
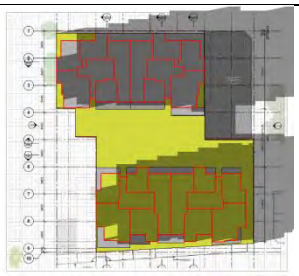
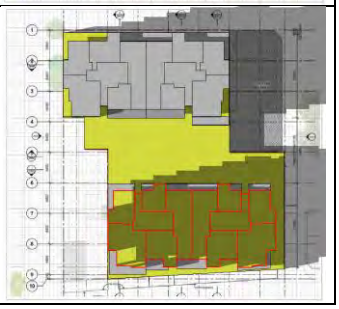
- Living rooms and private open spaces should receive a minimum of 2 hours direct sunlight between 9am-3pm in mid-winter, for at least 70% of apartments.

Typical floors have been modelled and assessed for solar access. In total 70% of apartments achieve 2 hours of solar access to living rooms and or private open spaces. The study seen overleaf, illustrates the areas of the development that receive direct solar access between 9am and 3pm on the 21st June.

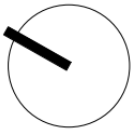
A full list of compliant dwellings can be found in the appendices.

Solar Access Study

Time	Level 01	Levels 02-05	Levels 06-07
9am			
10am			

Time	Level 01	Levels 02-05	Levels 06-07
11am			
12pm			
1pm			
2pm			
3pm			

3.2 Southerly Aspect



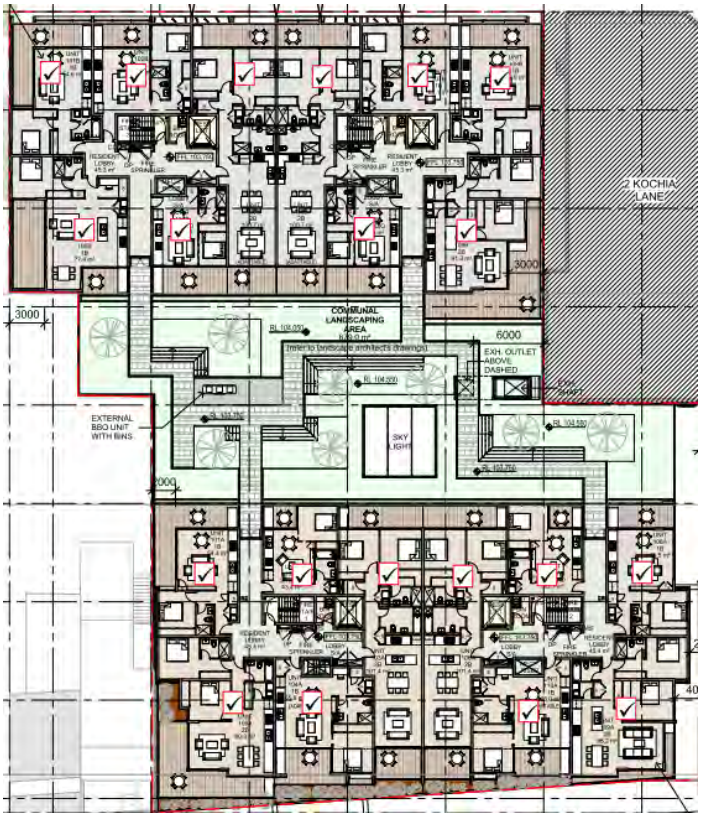
The southerly aspect requirement is:

- Maximum number of southerly (SW-SE) single-aspect apartments is 10%.

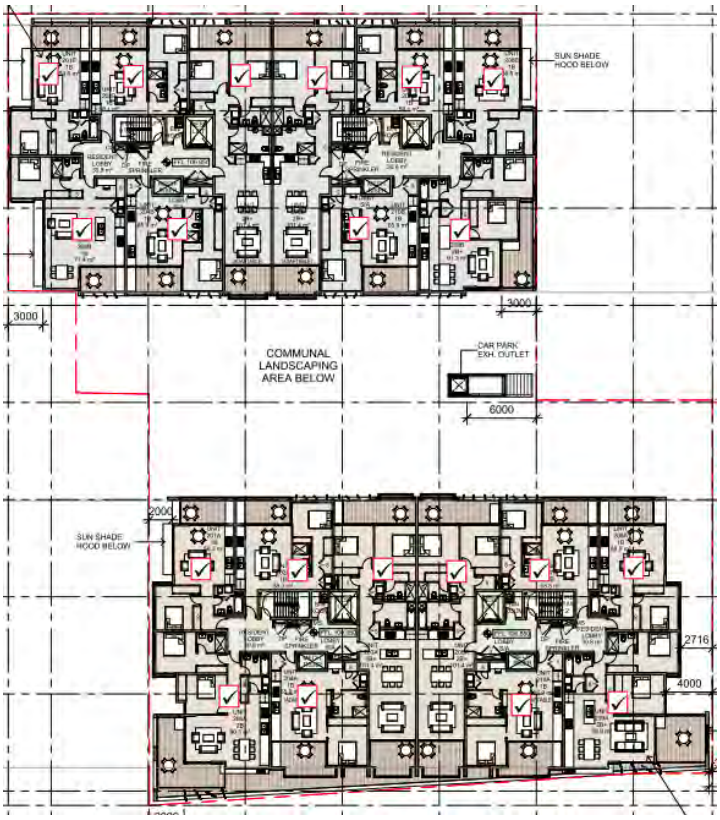
Each typical floor has been assessed and it has been concluded that all apartments are considered to either be dual aspect or do not only face in a southerly direction.

The images below indicate compliant apartments:

Level 01



Level 02 – 03



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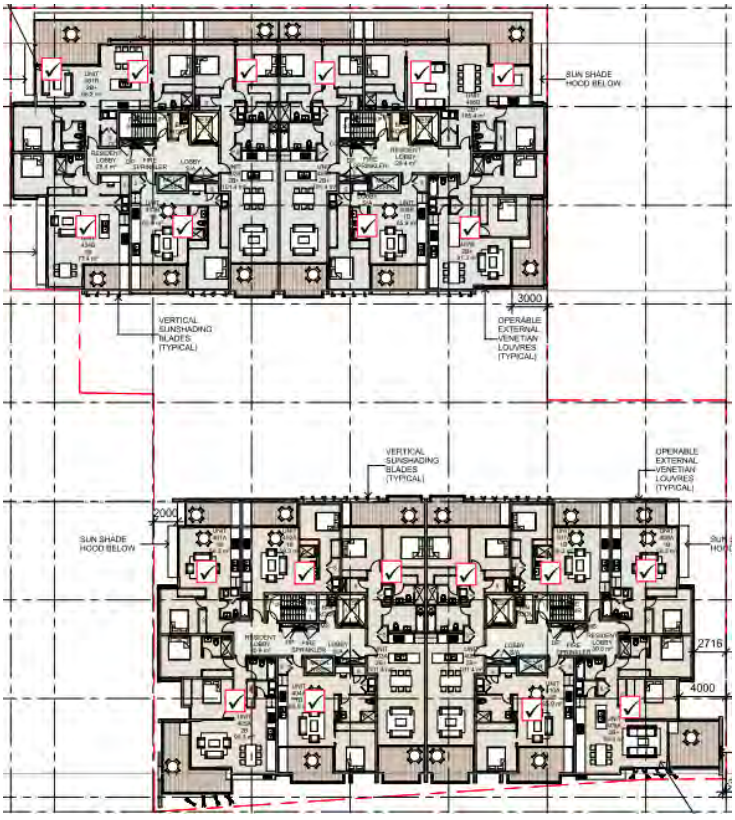
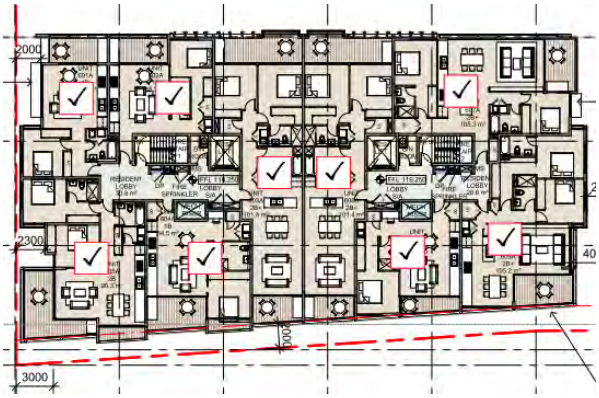


Level 06



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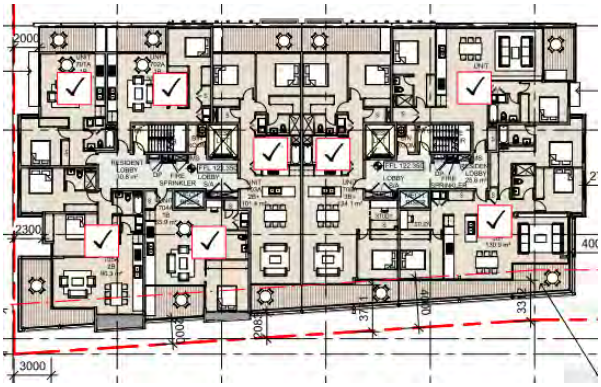


3.3 Natural Ventilation

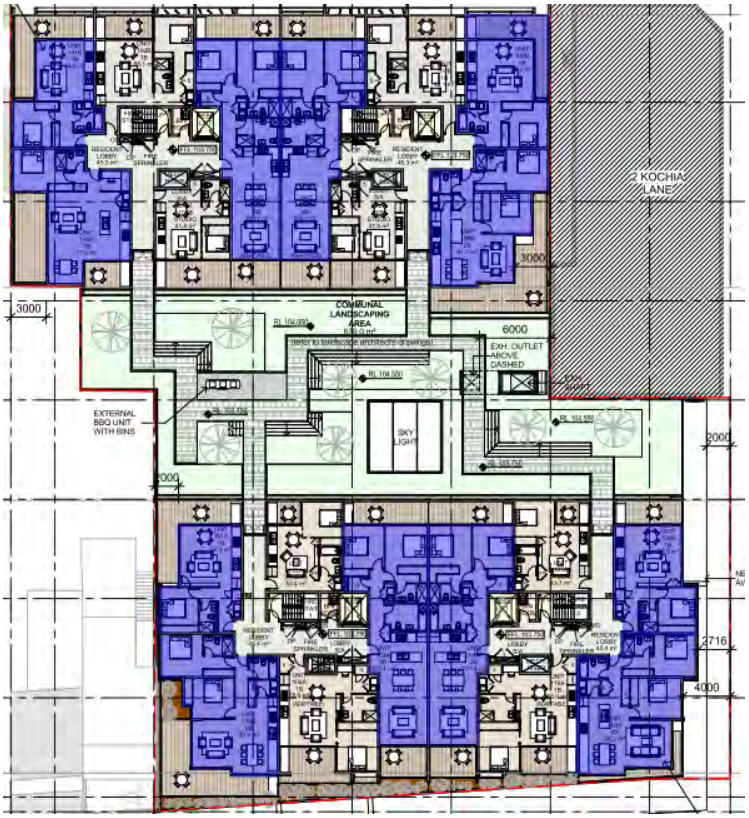
The natural ventilation requirement is:

- 60% of units should be naturally cross-ventilated with recommended maximum building depth: 10-18m

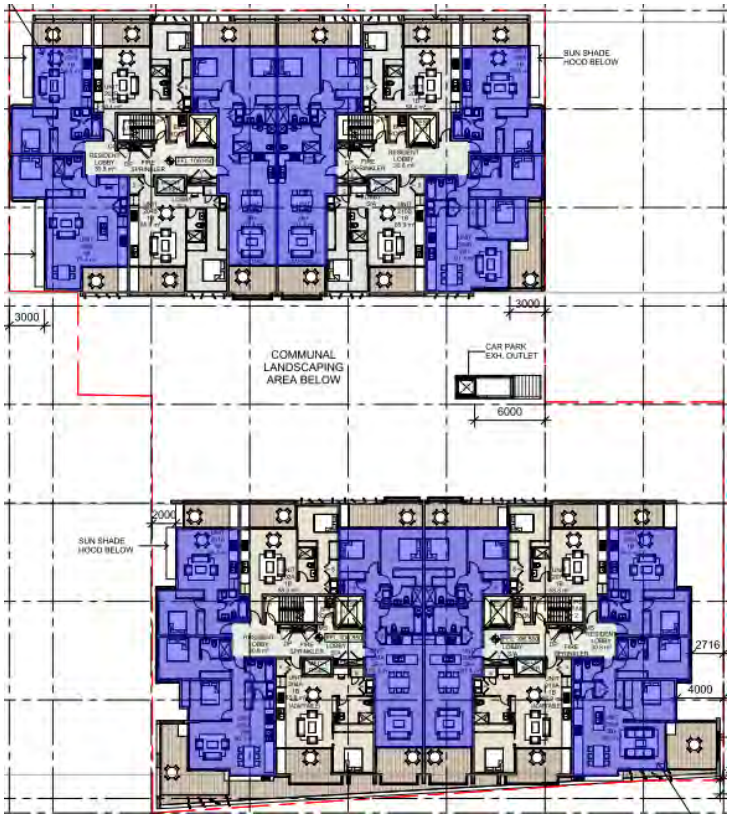
On review of each typical floor **72 (64%)** apartments comply with the cross-ventilation requirements of SEPP65. Windows facing the site boundaries have generally been set-back 3m from the boundary, allowing them to be operable as per the BCA requirements.

The compliant apartments are highlighted on the images below. A full list of compliant apartments can be found in the appendices.

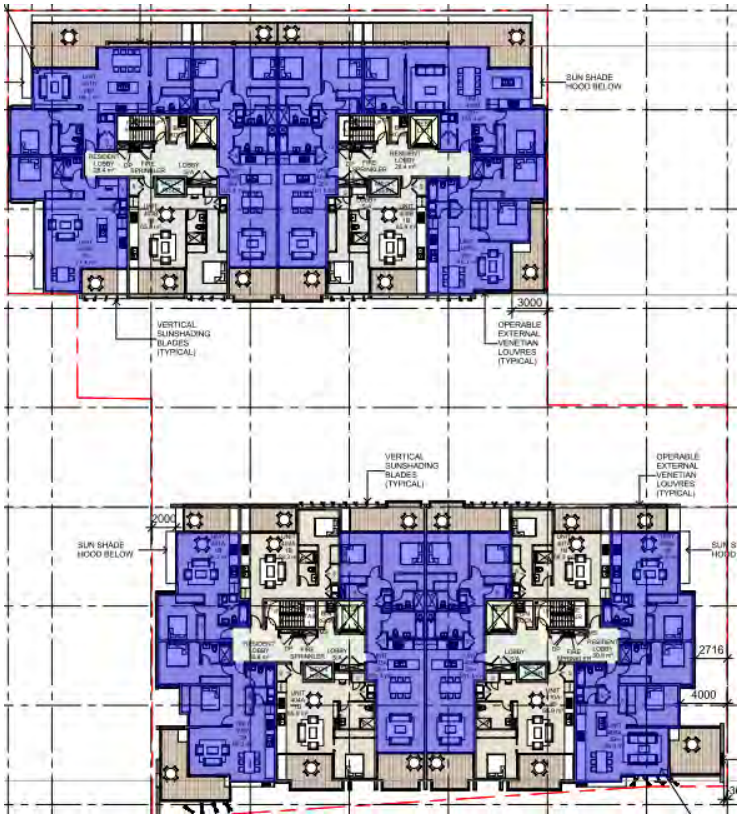
Level 01



Level 02 – 03



Level 04 – 05



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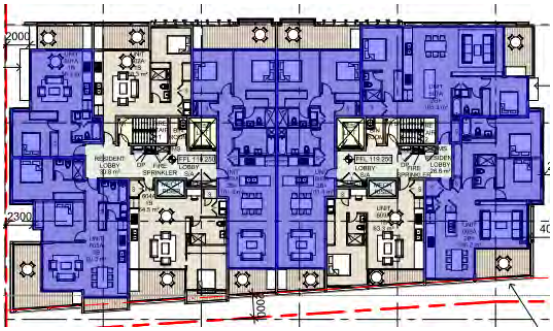
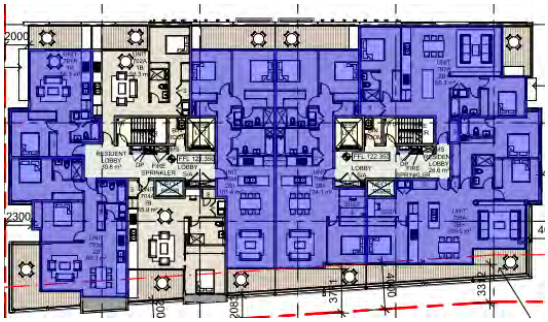


Level 07



4. BCA Section J

NCC Section J for Energy Efficiency

The retail portion of the development is required to comply with the NCC Section J for Energy Efficiency.

J1.3 Roof & Ceiling

The roof and ceiling of retail spaces located below the exterior of the building or non conditioned space, will achieve the following minimum total insulation levels for roof and ceiling constructions;

Roof	Minimum Total R-value Solar absorptance (0.4 - 0.6)
Below non-conditioned Space	3.7
Below External space	3.7
Below landscaped area	3.7

The values above assume that the external roof surface is of a medium colour and solar absorptance. This is considered conservative for the areas with landscaping above, as landscaping and plants absorb heat and hence reduce the heat absorbed by the upper roof surface.

J1.4 Roof Lights

A skylight is provided in the roof of the ground floor retail corridor. As this corridor is not provided with an air-conditioning system the skylight is not considered to form a part of the building envelope and J1.4 does not apply.

J1.5 Walls

The deemed-to-satisfy provisions specify the minimum total insulation levels for each external wall of a conditioned space and for internal walls separating conditioned space with non-conditioned space.

The development will be designed to comply with the requirements for climate zone 5, as summarised in the below table:

Wall type	Minimum Total R-value for Wall
External envelope	2.8
Internal wall adjacent to non-conditioned space with mechanical ventilation ≤ 1.5ach	1.0
Internal wall adjacent to non-conditioned space with mechanical ventilation > 1.5ach	1.8

J1.6 Floors

The deemed-to-satisfy provisions for floors specify minimum insulation levels for the suspended floors of conditioned spaces above non-conditioned space.

The retail suspended floors above the car park and non-conditioned spaces will be designed to comply with the following thermal performance requirements for climate zone 5:

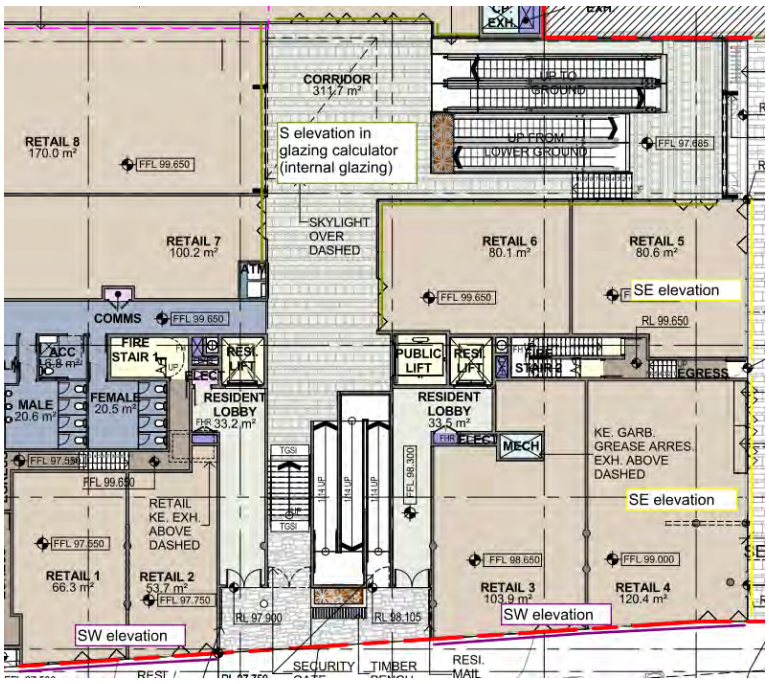
Floor type	Minimum Total R-value for Floor
Suspended floor above non-conditioned space with mechanical ventilation ≤ 1.5ach	1.0
Suspended floor above non-conditioned space with mechanical ventilation > 1.5ach	2.0

J2.0 Glazing

The retail glazing has been assessed to ensure that the aggregate air-conditioning value, calculated for each level and orientation does not exceed the allowance in Table J2.4a of the NCC. Based on the current design, each orientation will pass with single glazing of the thermal performance values summarised in the below table;

Level	Facade	U-value	SHGC	Glazing type
Ground (Retail)	SW	4.6	0.67	Single Low-e Clear
Ground (Retail)	Internal	4.6	0.67	Single Low-e Clear
Ground (Retail)	SE	4.6	0.52	Single Low-e Neutral

Note: All U-values and SHGC values are based on AFRC figures for total glazing including frames.



Completed glazing calculator can be found in the appendix.

Appendix 1. SEPP-65 Compliance

Solar Access SEPP-65 Compliant Apartments

Building #	Apartment #	Living Rooms 2 hours?	Living Room + Private Open Space 2 hours?
A	101	Y	Y
A	102	Y	Y
A	103	N	Y
A	104	N	N
A	105	Y	Y
A	106	N	Y
A	107	N	Y
A	108	Y	Y
A	109	N	N
A	110	N	N
A	201	Y	Y
A	202	Y	Y
A	203	N	Y
A	204	N	N
A	205	Y	Y
A	206	N	Y
A	207	N	Y
A	208	Y	Y
A	209	N	N
A	210	N	N
A	301	Y	Y
A	302	Y	Y
A	303	N	Y
A	304	N	N
A	305	Y	Y
A	306	N	Y
A	307	N	Y
A	308	Y	Y
A	309	N	N
A	310	N	N
A	401	Y	Y
A	402	Y	Y
A	403	N	Y
A	404	N	N
A	405	Y	Y
A	406	N	Y
A	407	Y	Y
A	408	Y	Y
A	409	N	N
A	410	N	N
A	501	Y	Y
A	502	Y	Y
A	503	N	Y
A	504	N	N
A	505	Y	Y
A	506	Y	Y
A	507	Y	Y
A	508	N	N
A	509	N	N
A	601	Y	Y
A	602	Y	Y
A	603	N	Y
A	604	N	N
A	605	Y	Y
A	606	N	Y
A	607	Y	Y
A	608	N	N
A	609	N	N

Building #	Apartment #	Living Rooms 2 hours?	Living Room + Private Open Space 2 hours?
A	701	Y	Y
A	702	Y	Y
A	703	N	Y
A	704	Y	Y
A	705	Y	Y
A	706	N	Y
A	707	Y	Y
A	708	Y	Y
B	101	Y	Y
B	102	Y	Y
B	103	N	Y
B	104	N	N
B	105	Y	Y
B	106	N	Y
B	107	Y	Y
B	108	Y	Y
B	109	N	N
B	110	N	N
B	201	Y	Y
B	202	Y	Y
B	203	N	Y
B	204	N	N
B	205	Y	Y
B	206	N	Y
B	207	Y	Y
B	208	Y	Y
B	209	N	N
B	210	N	N
B	301	Y	Y
B	302	Y	Y
B	303	N	Y
B	304	N	N
B	305	Y	Y
B	306	N	Y
B	307	Y	Y
B	308	Y	Y
B	309	N	N
B	310	N	N
B	401	Y	Y
B	402	N	Y
B	403	N	N
B	404	Y	Y
B	405	N	Y
B	406	Y	Y
B	407	N	N
B	408	N	N
B	501	Y	Y
B	502	N	N
B	503	N	N
B	504	Y	Y
B	505	N	N
B	506	Y	Y
B	507	N	N
B	508	N	N

Cross Ventilation SEPP-65 Compliant Apartments

Building #	Apartment #	Cross ventilation?
A	101	Y
A	102	N
A	103	Y
A	104	N
A	105	Y
A	106	Y
A	107	N
A	108	Y
A	109	Y
A	110	N
A	201	Y
A	202	N
A	203	Y
A	204	N
A	205	Y
A	206	Y
A	207	N
A	208	Y
A	209	Y
A	210	N
A	301	Y
A	302	N
A	303	Y
A	304	N
A	305	Y
A	306	Y
A	307	N
A	308	Y
A	309	Y
A	310	N
A	401	Y
A	402	N
A	403	Y
A	404	N
A	405	Y
A	406	Y
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A	409	Y
A	410	N
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A	502	N
A	503	Y
A	504	N
A	505	Y
A	506	Y
A	507	Y
A	508	Y
A	509	N
A	601	Y
A	602	N
A	603	Y
A	604	N
A	605	Y
A	606	Y
A	607	Y
A	608	Y
A	609	N

Building #	Apartment #	Cross ventilation?
A	701	Y
A	702	N
A	703	Y
A	704	N
A	705	Y
A	706	Y
A	707	Y
A	708	Y
B	101	Y
B	102	N
B	103	Y
B	104	N
B	105	Y
B	106	Y
B	107	N
B	108	Y
B	109	Y
B	110	N
B	201	Y
B	202	N
B	203	Y
B	204	N
B	205	Y
B	206	Y
B	207	N
B	208	Y
B	209	Y
B	210	N
B	301	Y
B	302	N
B	303	Y
B	304	N
B	305	Y
B	306	Y
B	307	N
B	308	Y
B	309	Y
B	310	N
B	401	Y
B	402	Y
B	403	N
B	404	Y
B	405	Y
B	406	Y
B	407	Y
B	408	N
B	501	Y
B	502	Y
B	503	N
B	504	Y
B	505	Y
B	506	Y
B	507	Y
B	508	N

Appendix 2. BCA Glazing Calculator

BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2013)

HELP

Building name/description: LINDFIELD MIXED-USE DEVELOPMENT 23-37 LINDFIELD AVE & 11 HAVILAH LA LINDFIELD NSW 2070

Application: shop display

Climate zone: 5

Storey: G

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A				99.9m²	196m²	128m²			
Option B									
Glazing area (A)				64.5m²	179m²	102m²			

Number of rows preferred in table below: 15 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading	Multipliers		Size	Outcomes	
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Retail 1	SW		3.60	6.00		4.6	0.67	3.000	3.700	0.81	0.10	0.66	0.57	21.60	21% of 93%
2	Retail 2	SW		3.60	5.00		4.6	0.67	3.000	3.700	0.81	0.10	0.66	0.57	18.00	18% of 93%
3	Retail 3	SW		3.60	8.60		4.6	0.67	3.000	3.700	0.81	0.10	0.66	0.57	30.96	30% of 93%
4	Retail 4	SW		3.60	8.80		4.6	0.67	3.000	3.700	0.81	0.10	0.66	0.57	31.68	31% of 93%
5	Retail 4	SE		3.50	5.20		4.6	0.52	2.000	4.400	0.45	0.90	0.96	0.92	18.20	29% of 96%
6	Retail 4	SE		3.50	2.60		4.6	0.52	2.000	4.400	0.45	0.90	0.96	0.92	9.10	14% of 96%
7	Retail 4	SE		2.40	5.10		4.6	0.52	2.000	3.100	0.65	0.70	0.91	0.86	12.24	18% of 96%
8	Retail 5	SE		2.80	5.60		4.6	0.52	2.000	3.900	0.51	1.10	0.94	0.90	15.68	24% of 96%
9	Retail 5	SE		3.30	2.80		4.6	0.52	2.000	4.500	0.44	1.20	0.96	0.92	9.24	15% of 96%
10	Retail 5	S		3.70	8.50		4.6	0.67	device		2.00	0.00	0.64	0.54	31.45	18% of 96%
11	Retail 6	S		3.70	10.60		4.6	0.67	device		2.00	0.00	0.64	0.54	39.22	22% of 96%
12	Retail 6	S		3.70	7.20		4.6	0.67	device		2.00	0.00	0.64	0.54	26.64	15% of 96%
13	Retail 7	S		3.70	3.50		4.6	0.67	device		2.00	0.00	0.64	0.54	12.95	7% of 96%
14	Retail 8	S		3.70	9.40		4.6	0.67	device		2.00	0.00	0.64	0.54	34.78	19% of 96%
15	Major Retail	S		3.70	9.20		4.6	0.67	device		2.00	0.00	0.64	0.54	34.04	19% of 96%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid