efficient LIVING

Thermal Comfort & BASIX Assessment

BUILDING
SUSTAINABILITY
CONSULTANTS

FRIENDLY INFORMATIVE EFFICIENT KNOWLEDGEABLE

SJB Architects
Proposed Residential Development

To be built at:

80-88 Regent Street,

Redfern NSW 2016

Issue	File Ref	Description	Author	Date
A	9108	Thermal Comfort and BASIX Assessment	HE	04/01/16
B	9927	Update to Thermal Comfort and BASIX Assessment	KH	27/01/16

This report has been prepared by Efficient Living Pty Ltd on behalf of our client SJB Architects. Efficient Living prepares all reports in accordance with the BASIX Thermal Comfort Protocol and is backed by professional indemnity insurance. This report takes into account our client's instructions and preferred building inclusions.

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80-88 Regent Street, Redfern

3 February 2016

Prepared for	SJB Architects Level 2, 490 Crown Street, Surry Hills, NSW 2010
Contact	Stefanie Hughes Phone: (02) 9380 9911 Email: SHughes@sjb.com.au
Introduction	Efficient Living has investigated the estimated thermal comfort, water and energy usage of the proposed development to be built at 80-88 Regent Street, Redfern. Heating and cooling loads for the development have been determined using BERS thermal simulation software. The report is based on the architectural drawings provided by SJB Architects. For further details, refer to the individual BASIX certificates and Efficient Living inclusions summary respectively.
Analysis	The BASIX assessment is divided into three sections, each independently measuring the efficiency of the development. These are Water, Thermal Comfort and Energy. BASIX requires a minimum target of 40% for the Water section. A BERS pass or fail is required for the thermal comfort section and a minimum required target of 20% for the energy section.
Water	The proposed development has achieved the BASIX Water target of 40%. The water usage of the development is calculated based on the number and efficiency of permanent fixtures and appliances such as taps, showerheads and toilets, the dish washer and clothes washing machine. The size of the rain tank and number of connections has a huge impact on your water score as does the area of gardens and lawns and whether or not low water plant species are incorporated.
Thermal comfort	Thermal Comfort targets are set by the Department of Planning in the form of heating and cooling caps. The buildings thermal physics is measured using BERS thermal performance assessment tools. This equates an expected level of energy consumption to heat and cool each dwelling per annum expressed in MJ (megajoules) per square meter of floor area. Each unit has individual heating and cooling caps and a weighted average heating and cooling load for the whole development. The weighted average caps are a lot harder to achieve than the individual unit caps.
Energy	The proposed development has achieved the energy target of 20% to pass this section. The energy usage of the development is calculated based on the efficiency of fixed appliances that will be used. This includes the air conditioning system, hot water system, lighting, exhaust fans, cook top, oven, and clothes drying facilities.

Inclusions summary	The inclusions as outlined in the table below have been incorporated in each unit to allow them to reach their environmental sustainability targets.
Thermal comfort	Average heating loads are 2% below allowable BASIX targets Average cooling loads are 72% below allowable BASIX targets
Glazing Doors/windows	Aluminium framed single clear glazing to all units: U-Value: 6.57 (equal to or lower than) SHGC: 0.74 (±10%) Given values are NFRC, total window values
Roof	Concrete roof no insulation Default light colour
Ceiling	Plasterboard ceiling, an R2.5 insulation where exposed roof above Plasterboard ceiling, an R1.0 insulation required where balcony above in unit 4.02 Plasterboard ceiling, no insulation where neighbouring units are above Note: Loss of ceiling insulation due to penetrations from down lights have been accounted for in accordance with BCA Technical Note 2 and assume non-ventilated LED down lights.
External wall	Cavity brick with internal stud an R1.0 insulation throughout Default medium colour
Inter tenancy walls	75 mm Hebel power panel wall – acoustic insulation as required
Walls with-in dwellings	Plasterboard on studs – no insulation
Floors	Concrete – no insulation required to units with garage below Concrete – suspended open subfloor with an R1.2 insulation required to units 2.05 and 2.06 Concrete between levels no insulation
Floor coverings	Carpet to bedrooms, tiles to bathrooms and laundry timber elsewhere

BASIX water inclusions	Score 40/40
Fixtures within units	Showerheads: Mid flow (>6L but <=7.5 L/min) Toilets: 4.0 star Kitchen taps: 4.0 star Bathroom vanity taps: 4.0 star
Appliances within units	Dishwashers: 3.5 star
Central rainwater storage	Not required to pass BASIX
Fire sprinkler system	Fire sprinkler test water contained in a closed loop system
BASIX energy inclusions	Score 20/20
Hot water system	Central gas-fired boiler with R0.6 (~25mm) insulation to ring main and supply risers
Lift motors	All lifts to have gearless traction with VVVF motor
Appliances & other efficiency measures within units	Gas cooktop & electric oven Dishwashers: 3.0 star Clothes dryers: 2.0 star
Heating & cooling within units	All units to have individual, single phase, reverse cycle air conditioning to living areas and at least 1 bedroom. A minimum of 1.5 stars is required in heating and cooling mode. Zoning nominated
Artificial lighting within units	At least 80% of all light fittings with-in each room are to have fluorescent or LED globes.
Ventilation within units	Bathroom – Individual fan, ducted to roof or façade – manual on / manual off switch Laundry – Individual fan, ducted to roof or façade – manual on / manual off switch Kitchen range hood – Individual fan, ducted to roof or façade – manual on / manual off switch

Artificial lighting to common areas	Car park area – Fluorescent lights with zoned switching and motion sensors Lifts – LED lights connected to lift call button Bin & waste holding rooms – Fluorescent lights with motion sensor Plant – Fluorescent lights with manual on / manual off switch Substation – Fluorescent lights with manual on / manual off switch WC's – Fluorescent lights with manual on / manual off switch Ground floor lobbies and breezeways – LEDs with zoned switching and motion sensors
Ventilation to common areas	Car park area – supply & exhaust air with a carbon monoxide monitor & VSD fan Garbage rooms – Exhaust air, running continuously Plant – Supply only, interlocked to light Substation – Supply only, interlocked to light WC's - Exhaust only, interlocked to light Breezeways – Naturally ventilated
Alternative energy	No BASIX requirement for alternative energy
Documentation	This report is based upon the following plans prepared by SJB Architects Job No. 5359 Drawing No. DA- 001, 0101 – 0103, 0201 - 0216, 0501, 0502, 0601 & 0602.
Report Contact	Kristy Harrison Phone: (02) 9970 6181 Email: kristy@efficientliving.com.au

Thermal Comfort Results

Proposed Residential Development

80-88 Regents Street, Redfern NSW 2016

Issued in accordance with **BASIX** Thermal Comfort Simulation Method

Certificate # 14733815 **Accreditation # VIC/BDAV/12/1473**

Thermal performance specifications

Unit number	Number of Bedrooms	Floor area (M^2)		Predict. loads (MJ/M^2/y)		Star Rating	Window in Bathroom	Window in Kitchen	Thermal Comfort Upgrades
		Con.	Uncon.	Heat	Cool (Sens & Lat)				
2.01	2	72	5	34	13	6.0	1	No	None
2.02	1	39	0	66	25	3.5	0	Yes	None
2.03	1	37	0	60	16	4.0	0	Yes	None
2.04	1	43	7	49	13	5.0	1	No	None
2.05	1	52	0	66	15	4.0	1	No	R1.2 insulation to open sub floor
2.06	2	75	0	55	9	5.0	0	No	R1.2 insulation to open sub floor
3.01	2	74	0	36	11	6.0	1	No	None
3.02	1	39	0	59	14	4.5	0	Yes	None
3.03	1	37	0	60	16	4.0	0	Yes	None
3.04	1	43	7	49	13	5.0	1	No	None
3.05	1	52	0	58	11	4.5	1	No	None
3.06	2	75	0	39	10	6.0	0	No	None
4.01	2	72	5	35	12	6.0	1	No	None
4.02	1	39	0	65	24	3.5	0	Yes	R1.0 insulation required where balcony above
4.03	1	37	0	66	16	4.0	0	Yes	R1.0 insulation required where balcony above
4.04	1	43	7	50	14	5.0	1	No	None
4.05	1	52	0	58	11	4.5	1	No	None
4.06	2	75	0	40	10	6.0	0	No	None
5.01	2	72	5	36	15	5.5	1	No	None
5.02	1	52	0	66	22	4.0	1	No	None
5.03	2	70	5	53	16	4.5	2	No	None
5.04	1	52	0	59	10	4.5	1	No	None
5.05	2	75	0	40	10	6	0	No	None
6.01	2	72	5	36	14	6.0	1	No	None
6.02	1	52	0	46	13	5.0	0	No	None
6.03	2	71	5	61	13	4.5	2	No	None
6.04	1	52	0	60	10	4.5	1	No	None
6.05	2	75	0	40	10	6	0	No	None
7.01	2	72	5	36	14	6.0	0	No	None
7.02	1	52	0	46	13	5.0	2	No	None
7.03	2	71	5	61	13	4.5	1	No	None
7.04	1	52	0	60	10	4.5	0	No	None
7.05	2	75	0	41	10	6.0	1	No	None
8.01	2	72	5	38	13	5.5	0	No	None
8.02	1	52	0	48	12	5.0	2	No	None

Efficient Living
Sustainable Building Consultants
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Thermal performance specifications

Unit number	Number of Bedrooms	Floor area (M^2)		Predict. loads (MJ/M²/y)		Star Rating	Window in Bathroom	Window in Kitchen	Thermal Comfort Upgrades
		Con.	Uncon.	Heat	Cool (Sens & Lat)				
8.03	2	70	5	63	10	4.5	1	No	None
8.04	1	52	0	60	10	4.5	0	No	None
8.05	2	75	0	41	10	6.0	1	No	None
9.01	2	72	5	38	13	5.5	0	No	None
9.02	1	52	0	48	12	5.0	2	No	None
9.03	2	70	5	63	10	4.5	1	No	None
9.04	1	52	0	60	10	4.5	0	No	None
9.05	2	75	0	42	10	5.5	1	No	None
10.01	2	72	5	38	13	5.5	0	No	None
10.02	1	52	0	48	12	5.0	2	No	None
10.03	2	70	5	63	10	4.5	1	No	None
10.04	1	52	0	60	10	4.5	0	No	None
10.05	2	75	0	42	10	5.5	1	No	None
11.01	2	72	5	38	12	6.0	1	No	None
11.02	1	52	0	50	12	5.0	2	No	None
11.03	2	70	5	51	10	5.0	1	No	None
11.04	1	52	0	65	10	4.5	0	No	None
11.05	2	75	0	42	10	5.5	1	No	None
12.01	2	72	5	38	12	6.0	0	No	None
12.02	1	52	0	50	12	5.0	2	No	None
12.03	2	70	5	51	10	5.0	1	No	None
12.04	1	52	0	65	10	4.5	0	No	None
12.05	2	75	0	42	10	5.5	1	No	None
13.01	2	72	5	46	12	5.5	0	No	None
13.02	1	52	0	50	12	5.0	2	No	None
13.03	2	70	5	51	10	5.0	1	No	None
13.04	1	52	0	61	10	4.5	0	No	None
13.05	2	75	0	41	10	5.5	0	No	None
14.01	3	86	4	38	21	6.0	1	No	None
14.02	3	91	5	66	9	4.0	1	No	None
14.03	1	52	0	60	10	4.5	0	No	None
14.04	2	75	0	41	10	6	0	No	None
15.01	3	93	4	37	16	5.5	1	No	None
15.02	3	91	5	63	9	4.5	1	No	None
15.03	1	52	0	60	10	4.5	1	No	None
15.04	2	75	0	41	10	6	0	No	None

Thermal Comfort Results

Proposed Residential Development

80-88 Regents Street, Redfern NSW 2016

Issued in accordance with **BASIX** Thermal Comfort Simulation Method

Certificate # 14733815 **Accreditation # VIC/BDAV/12/1473**

Thermal performance specifications

Unit number	Number of Bedrooms	Floor area (M^2)		Predict. loads (MJ/M²/y)		Star Rating	Window in Bathroom	Window in Kitchen	Thermal Comfort Upgrades
		Con.	Uncon.	Heat	Cool (Sens & Lat)				
16.01	3	93	4	42	16	5.0	1	No	None
16.02	3	91	5	63	9	4.5	1	No	None
16.03	1	52	0	60	10	4.5	1	No	None
16.04	2	75	0	39	11	6.0	0	No	None
17.01	2	135	4	51	20	4.5	0	No	None
17.02	2	105	0	66	15	4.0	2	No	None
17.03	3	125	12	66	16	4.0	2	No	None
17.04	2	76	0	65	13	4.0	1	No	None
17.05	3	133	0	51	16	4.5	1	No	None

NatHERS Certificate
New Dwelling

5.0 Stars

Simulation Software

Software Name	BERS Pro 4.2
Software Version	Release 110811/A
Engine Version	CHENATH V2.13

Simulation Details

Project Name	F-100 - unit 2.04, 3.04_1
Date	29/12/2015
Location	REDFERN PC 2016
Climate file	climat56.TXT
Adjusted Star Rating	5.0 Stars
Conditioned Area	42.79 m²
Unconditioned Area	6.88 m²
Adjusted Cooling	13.4 MJ/m²
Adjusted Heating	48.9 MJ/m²
Adjusted Total	62.3 MJ/m²

Energy Rating Certificate Number 14733851

☐ single-dwelling rating 5.0 stars

☒ multi-unit development (attach listing of ratings) heating 51 MJ/m²
If selected, data specified is the average across the entire development cooling 12 MJ/m²

Recessed downlights confirmation: ☒ Rated with ☐ Rated without

Assessor Name/Number Tracey Cools VIC/BDAV/12/1473

Assessor Signature _____ Date 27/01/16

Dwelling Address

DP Number	105824
Unit Number	
Lot Number	A-E
House Number	80-88
Street Name	Regents Street
Development Name	
Suburb	Redfern NSW 2016

Client Details

Name	SJB Architects
Phone	61 2 9380 9911 Fax 61 2 9380 9922
Email	info@sjb.com.au
Postal Address	Level 2, 490 Crown Street, Surry Hills NSW 2010
Street Details	Level 2, 490 Crown Street, Surry Hills NSW 2010

Assessor Details

Name	Tracey Cools
Phone	02 9970 6181 Fax 02 9970 6181
Email	admin@efficientliving.com.au
Postal Address	13/13 Lagoon Street, Narrabeen NSW 2101
Street Details	13/13 Lagoon Street, Narrabeen NSW 2101

Signed by the Assessor.....Date....27 / 01 / 16....

Tilted roof windows with blinds cannot be modelled using this version of BERSPro.
All windows are modelled with Holland Blinds for regulatory purposes.

Building Element Details

Project F-100 - unit 2.04, 3.04 Run 1
REDFERN PC 2016 Lat -33.90 Long 151.20 Climate File climat56.TXT

Summary

Conditioned Area	42.8 m²
Unconditioned Area	6.9 m²
Total Floor Area	49.7 m²
Total Glazed Area	16.0 m²
Total External Solid door Area	1.6 m²
Glass to Floor Area	32.3 %
Gross External Wall Area	83.2 m²
Net External Wall Area	65.6 m²

Window
16.0 m² GGG-05-001a Generics Uval 6.57 SHGC 0.74
Glass Single Glazed Clear
Frame Aluminium

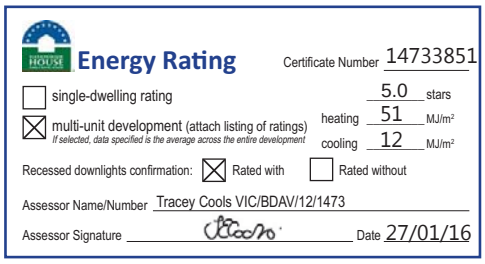
External Wall
31.3 m² PowerPanel to neighbour No Insulation
34.2 m² Cavity Brick Bulk Insulation R 1.0

Internal Wall
25.1 m² Cavity Panel 70mm gap No Insulation

External Floor
31.0 m² Concrete Slab, Unit Below Cork Tiles or Parquetry 8mm No Insulation
6.9 m² Concrete Slab, Unit Below Ceramic Tiles 8mm No Insulation
11.8 m² Concrete Slab, Unit Below Carpet 10mm No Insulation

External Ceiling
49.7 m² Plasterboard No Insulation Apartment above

Roof (Horizontal area)
49.7 m² Concrete No Insulation, Only an Air Gap 0° slope Skillion roof



BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 695486M_03

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 18/09/2014 published by Planning & Infrastructure. This document is available at www.basix.nsw.gov.au

Director-General
Date of issue: Wednesday, 27 January 2016
To be valid, this certificate must be lodged within 3 months of the date of issue.

NSW GOVERNMENT Planning & Infrastructure

Project summary	
Project name	80-88 Regents Street Redfern_03
Street address	80 Regent Street Redfern 2016
Local Government Area	Sydney City Council
Plan type and plan number	deposited 105824
Lot no.	A
Section no.	-
No. of residential flat buildings	1
No. of units in residential flat buildings	80
No. of multi-dwelling houses	0
No. of single dwelling houses	0

Project score		
Water	✔ 40	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 20	Target 20

Certificate Prepared by
Name / Company Name: Efficient Living
ABN (if applicable): 82116346082

Description of project

Project address	
Project name	80-88 Regents Street Redfern_03
Street address	80 Regent Street Redfern 2016
Local Government Area	Sydney City Council
Plan type and plan number	deposited 105824
Lot no.	A
Section no.	-
Project type	
No. of residential flat buildings	1
No. of units in residential flat buildings	80
No. of multi-dwelling houses	0
No. of single dwelling houses	0
Site details	
Site area (m²)	821.7
Roof area (m²)	539
Non-residential floor area (m²)	365.0
Residential car spaces	52
Non-residential car spaces	14

Common area landscape		
Common area lawn (m²)	0.0	
Common area garden (m²)	420.0	
Area of indigenous or low water use species (m²)	0.0	
Assessor details		
Assessor number	BDAV/12/1473	
Certificate number	14733815	
Climate zone	56	
Project score		
Water	✔ 40	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 20	Target 20

Description of project

The tables below describe the dwellings and common areas within the project

Residential flat buildings - Building1, 80 dwellings, 21 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
2.01	2	72.0	5.0	0.0	0.0
2.05	1	52.0	0.0	0.0	0.0
3.03	1	37.0	0.0	0.0	0.0
4.01	2	72.0	5.0	0.0	0.0
4.05	1	52.0	0.0	0.0	0.0
5.03	2	70.0	5.0	0.0	0.0
6.02	1	52.0	0.0	0.0	0.0
7.01	2	72.0	5.0	0.0	0.0
7.05	2	75.0	0.0	0.0	0.0
8.04	1	52.0	0.0	0.0	0.0
9.03	2	70.0	5.0	0.0	0.0
10.02	1	52.0	0.0	0.0	0.0
11.01	2	72.0	5.0	0.0	0.0
11.05	2	75.0	0.0	0.0	0.0
12.04	1	52.0	0.0	0.0	0.0
13.03	2	70.0	5.0	0.0	0.0
14.02	3	91.0	5.0	0.0	0.0
15.02	3	91.0	5.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
2.02	1	39.0	0.0	0.0	0.0
2.06	2	75.0	0.0	0.0	0.0
3.04	1	43.0	7.0	0.0	0.0
4.02	1	39.0	0.0	0.0	0.0
4.06	2	75.0	0.0	0.0	0.0
5.04	1	52.0	0.0	0.0	0.0
6.03	2	71.0	5.0	0.0	0.0
7.02	1	52.0	0.0	0.0	0.0
8.01	2	72.0	5.0	0.0	0.0
8.05	2	75.0	0.0	0.0	0.0
9.04	1	52.0	0.0	0.0	0.0
10.03	2	70.0	5.0	0.0	0.0
11.02	1	52.0	0.0	0.0	0.0
12.01	2	72.0	5.0	0.0	0.0
12.05	2	75.0	0.0	0.0	0.0
13.04	1	52.0	0.0	0.0	0.0
14.03	1	52.0	0.0	0.0	0.0
15.03	1	52.0	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
2.03	1	37.0	0.0	0.0	0.0
3.01	2	74.0	0.0	0.0	0.0
3.05	1	52.0	0.0	0.0	0.0
4.03	1	37.0	0.0	0.0	0.0
5.01	2	72.0	5.0	0.0	0.0
5.05	2	75.0	0.0	0.0	0.0
6.04	1	52.0	0.0	0.0	0.0
7.03	2	71.0	5.0	0.0	0.0
8.02	1	52.0	0.0	0.0	0.0
9.01	2	72.0	5.0	0.0	0.0
9.05	2	75.0	0.0	0.0	0.0
10.04	1	52.0	0.0	0.0	0.0
11.03	2	70.0	5.0	0.0	0.0
12.02	1	52.0	0.0	0.0	0.0
13.01	2	72.0	5.0	0.0	0.0
13.05	2	75.0	0.0	0.0	0.0
14.04	2	75.0	0.0	0.0	0.0
15.04	2	75.0	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
2.04	1	43.0	7.0	0.0	0.0
3.02	1	39.0	0.0	0.0	0.0
3.06	2	75.0	0.0	0.0	0.0
4.04	1	43.0	7.0	0.0	0.0
5.02	1	52.0	0.0	0.0	0.0
6.01	2	72.0	5.0	0.0	0.0
6.05	2	75.0	0.0	0.0	0.0
7.04	1	52.0	0.0	0.0	0.0
8.03	2	70.0	5.0	0.0	0.0
9.02	1	52.0	0.0	0.0	0.0
10.01	2	72.0	5.0	0.0	0.0
10.05	2	75.0	0.0	0.0	0.0
11.04	1	52.0	0.0	0.0	0.0
12.03	2	70.0	5.0	0.0	0.0
13.02	1	52.0	0.0	0.0	0.0
14.01	3	86.0	4.0	0.0	0.0
15.01	3	93.0	4.0	0.0	0.0
16.01	3	93.0	4.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
16.02	3	91.0	5.0	0.0	0.0
17.02	2	105.0	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
16.03	1	52.0	0.0	0.0	0.0
17.03	3	125.0	12.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
16.04	2	75.0	0.0	0.0	0.0
17.04	2	76.0	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
17.01	2	135.0	4.0	0.0	0.0
17.05	3	133.0	0.0	0.0	0.0

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - Building1

Common area	Floor area (m²)
Car park	2758.0
Bin & waste holding rooms	179.29
WC's	10.0

Common area	Floor area (m²)
Lift car (No. 1)	-
Plant rooms	78.4
Breezeways	530.35

Common area	Floor area (m²)
Lift car (No. 2)	-
Substation	19.7

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - Building1
    (a) Dwellings
        (i) Water
        (ii) Energy
        (iii) Thermal Comfort
    (b) Common areas and central systems/facilities
        (i) Water
        (ii) Energy

2. Commitments for multi-dwelling houses

3. Commitments for single dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)
        (i) Water
        (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for Residential flat buildings - Building1

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	3 star (> 6 but <= 7.5 L/min)	4 star	4 star	4 star	no	-	3.5 star	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔ ✔	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔ ✔ ✔	✔
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
17.03	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	3	2	yes	yes	yes	yes	2	no
15.01, 16.01	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	3	2	yes	yes	yes	yes	0	no
14.02, 15.02, 16.02, 17.05	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	3	2	yes	yes	yes	yes	1	no
2.02, 2.03, 3.02, 3.03, 4.02, 4.03	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1	2	yes	yes	yes	yes	0	yes
6.02, 7.02, 8.02, 9.02, 10.02, 11.02, 12.02, 13.02	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1	2	yes	yes	yes	yes	0	no

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
5.03, 6.03, 7.03, 8.03, 9.03, 10.03, 11.03, 12.03, 13.03, 17.04	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	2	2	yes	yes	yes	yes	2	no
2.01, 3.01, 4.01, 5.01, 6.01, 7.01, 8.01, 9.01, 10.01, 11.01, 12.01, 13.01, 15.04, 16.04	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	2	2	yes	yes	yes	yes	1	no

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
2.06, 3.06, 4.06, 5.05, 6.05, 7.05, 8.05, 9.05, 10.05, 11.05, 12.05, 13.05, 14.01, 14.04, 17.01, 17.02	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	2	2	yes	yes	yes	yes	0	no
2.04, 2.05, 3.04, 3.05, 4.04, 4.05, 5.02, 5.04, 6.04, 7.04, 8.04, 9.04, 10.04, 11.04, 12.04, 13.04, 14.03, 15.03, 16.03	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1-phase airconditioning 1.5 Star (new rating) (zoned)	1	2	yes	yes	yes	yes	1	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	no	3 star	-	2 star	no	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
2.01	34.0	13.0
2.02	66.0	25.0
2.06	55.0	9.0
3.01	36.0	11.0
3.02	59.0	14.0
3.06	39.0	10.0
4.01	35.0	12.0
4.02	65.0	24.0
4.04	50.0	14.0
5.01	36.0	15.0
5.02	66.0	22.0
5.03	53.0	16.0
5.04	59.0	10.0
13.01	46.0	12.0
13.04	61.0	10.0
14.01	38.0	21.0
14.02	66.0	9.0
15.01	37.0	16.0
16.01	42.0	16.0
16.04	39.0	11.0
17.01	51.0	20.0
17.04	65.0	13.0
17.05	51.0	16.0
2.03, 3.03	60.0	16.0
2.04, 3.04	49.0	13.0
3.05, 4.05	58.0	11.0
6.01, 7.01	36.0	14.0

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
6.02, 7.02	46.0	13.0
6.03, 7.03	61.0	13.0
2.05, 17.02	66.0	15.0
4.03, 17.03	66.0	16.0
11.01, 12.01	38.0	12.0
11.04, 12.04	65.0	10.0
15.02, 16.02	63.0	9.0
4.06, 5.05, 6.05	40.0	10.0
8.01, 9.01, 10.01	38.0	13.0
8.02, 9.02, 10.02	48.0	12.0
8.03, 9.03, 10.03	63.0	10.0
11.02, 12.02, 13.02	50.0	12.0
11.03, 12.03, 13.03	51.0	10.0
9.05, 10.05, 11.05, 12.05	42.0	10.0
7.05, 8.05, 13.05, 14.04, 15.04	41.0	10.0
All other dwellings	60.0	10.0

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Fire sprinkler system (No. 1)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Car park	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	zoned switching with motion sensor	No
Lift car (No. 1)	-	-	light-emitting diode	connected to lift call button	No
Lift car (No. 2)	-	-	light-emitting diode	connected to lift call button	No
Bin & waste holding rooms	ventilation exhaust only	-	fluorescent	motion sensors	No
Plant rooms	ventilation supply only	interlocked to light	fluorescent	manual on / manual off	No
Substation	ventilation supply only	interlocked to light	fluorescent	manual on / manual off	No
WC's	ventilation exhaust only	interlocked to light	fluorescent	manual on / manual off	No
Breezeways	no mechanical ventilation	-	light-emitting diode	zoned switching with motion sensor	No

Central energy systems	Type	Specification
Central hot water system (No. 1)	gas-fired boiler	Piping insulation (ringmain & supply risers): (a) Piping external to building: R0.6 (~25 mm); (b) Piping internal to building: R0.6 (~25 mm)
Lift (No. 1)	gearless traction with V V V F motor	Number of levels (including basement): 25
Lift (No. 2)	gearless traction with V V V F motor	Number of levels (including basement): 25

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Reticulated alternative water supply	-	Installation of plumbing to make provision for connection to No scheme found reticulated alternative water supply.	

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).