APPENDIX S

BASIX Report & Certificate

Prepared by
VIPAC Engineers

Ettalong Beach
218-220 Memorial Avenue & 47-50 The Esplanade
Ettalong Beach Town Centre

Development Application January 2010

Kann Finch Group

The Esplanade, Ettalong Beach

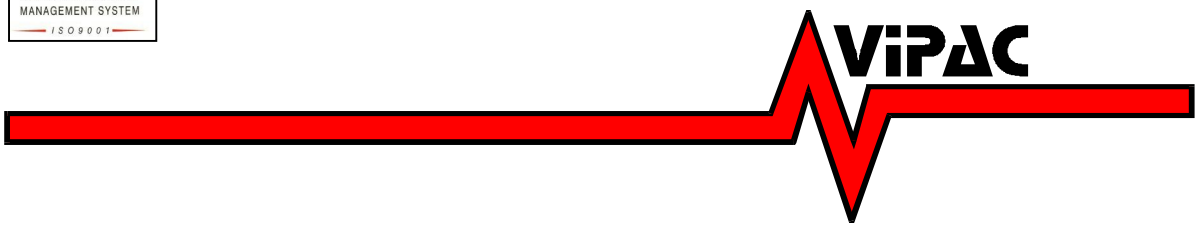
BASIX Assessment

Report No. 20C-09-0308-TRP-452541-1

Vipac Engineers & Scientists Ltd

Sydney, NSW

19th January 2009



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BASIX Assessment

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EXECUTIVE SUMMARY

VIPAC Engineers & Scientists Ltd. has been commissioned by Kann Finch Group to assess the interaction of the proposed The Esplanade, Ettalong Beach development with the local environment in terms of BASIX compliance.

The proposed development comprises of:

- 45 Residential apartment units.

Dwellings within the development will be a mix of single storey dwellings with 1, 2 and 3 bedrooms. Each dwelling will include balcony/terrace space.

Dwellings within the development have been assessed in terms of their passive energy design using the Nationwide House Energy Rating scheme (NatHERS). They have also been assessed in terms of their ability to conserve water and also to minimise energy consumption via appliances and hot water etc. With the recommendations contained within this report we find that the proposed development is able to achieve a BASIX certificate.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

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1. INTRODUCTION

BASIX is a web-based planning tool designed to assess the potential performance of new homes against a range of sustainability issues including Landscape, Stormwater, Water, Thermal Comfort and Energy. BASIX aims to reduce the environmental impact of these features of new residential housing and therefore will produce homes that are more comfortable and cheaper to run than most existing homes.

BASIX focuses on reducing Water and Energy use. Landscape, Stormwater and Thermal Comfort indices are also included in the assessment as information relating to these attributes impacts on water consumption and greenhouse gas emissions. BASIX has set targets so that each new residential development will use less drinking-quality water and produce less greenhouse gas emissions than average NSW homes of the same type (20% for developments of 6 storeys or over).

BERS Pro is Australian designed 2nd Generation software used for assessing the thermal performance of residential units and houses. BERS Pro computer simulation of residential developments forms part of the Nationwide House Energy Rating Scheme, and is used to assess the potential of a residential development to have low energy requirements once operational.

2. WATER

The proposed The Esplanade, Ettalong Beach development has achieved the BASIX Water target of 40%. For details of the requirements necessary to achieve this target, please refer to the BASIX Certificate No. 289673M provided for this submission.

Requirements:

- 180,000L Rainwater tank collecting from 1920m^2 of roof area.
- Rainwater tank will be used for toilet flushing.
- Common area fixtures must install 3-star (Water Rating) showerheads, 4-star (Water Rating) toilets, 5-star (Water rating) taps.
- All dwellings must install 3-star (Water Rating) showerheads, 4-star (Water Rating) toilets, 5-star (Water rating) taps for kitchen & bathrooms.

3. THERMAL COMFORT

3.1. BERS PRO MODELLING ASSUMPTIONS

BERS Pro calculates the transient hourly heat gains and losses for each space inside a building taking into account the buildingôs thermal storage, typical residential operational schedules and hourly weather data.

The ñbase-caseò modelled materials of construction for the development are described in Table 1. Building geometry and orientation were modelled according to supplied drawings.

Table 1: Construction Materials - Base Case (BERS Pro Model)

Element	Material	Detail
External walls	Concrete lined	See Elevations
	Insulation	None
	Light colour	0.475<absorptance<0.7
Internal walls	Cavity Panel	
Windows	Single glazed	with Holland Blinds (default)
	Aluminium frame	
Ceilings	Plasterboard	Standard ceiling plasterboard
	Insulation	None
Roof	Concrete	Medium colour 0.475<absorptance<0.7
	Insulation	None
Floors	Concrete	Carpet covering: everywhere
		Tiles covering: Wet Areas

3.2. BERS PRO RESULTS (THERMAL COMFORT)

Energy summary reports for each modelled residential dwelling space are summarized in Table 2 below. The residential units chosen for analysis were considered to encompass the diversity of unit design within the whole development in terms of energy efficiency. The Additional Treatment listed in Table 2 below need to be implemented to the corresponding dwellings to achieve the heating and cooling loads required by BASIX.

Table 2: BERS Pro Energy Consumption Results and Star Rating

Unit	Represented Units	Heating Load (MJ/m^2.yr)	Cooling Load (MJ/m^2.yr)	Maximum BASIX Heating Load (MJ/m^2.yr)	Maximum BASIX Cooling Load (MJ/m^2.yr)	Pass/Fail	Additional Treatments Re uired
1	16,25,32,39	55.1	38.0	50.0	41.0	**Pass**	None
2		74.6	11.1	50.0	41.0	**Pass**	None
3	4	71.2	8.8	50.0	41.0	**Pass**	None
5		82.7	15.2	50.0	41.0	**Pass**	None
6		66.2	13.6	50.0	41.0	**Pass**	None
7		95.1	8.4	50.0	41.0	**Pass**	None
8		85.1	11.5	50.0	41.0	**Pass**	None
9		62.3	7.7	50.0	41.0	**Pass**	None
10		63.6	6.9	50.0	41.0	**Pass**	Performance Glazing (Total Window System U=4.1, SHGC=0.68) to all glazing
11	19,28,35,42	52.9	26.6	50.0	41.0	**Pass**	Performance Glazing (Total Window System U=4.1, SHGC=0.68) to all glazing
12	21	95.2	12.5	50.0	41.0	**Pass**	Performance Glazing (Total Window System U=4.1, SHGC=0.68) to all glazing
13	22	54.9	16.1	50.0	41.0	**Pass**	None
14	23	84.2	10.5	50.0	41.0	**Pass**	None
15	24	51.2	14.5	50.0	41.0	**Pass**	None
17	26,33,40	75.5	8.1	50.0	41.0	**Pass**	Performance Glazing (Total Window System U=4.1, SHGC=0.68) to all glazing
18	27,34,41	56.2	8.1	50.0	41.0	**Pass**	Performance Glazing (Total Window System U=4.1, SHGC=0.68) to all glazing
20	29,36,43	88.9	32.5	50.0	41.0	**Pass**	None
30	37	70.0	20.0	50.0	41.0	**Pass**	None
31	38	68.5	19.0	50.0	41.0	**Pass**	Performance Glazing (Total Window System U=4.1, SHGC=0.68) to all glazing
44		49.7	46.5	50.0	41.0	**Pass**	R1.0 External Wall Insulation, R3.5 Ceiling Insulation
45		46.8	46.0	50.0	41.0	**Pass**	R1.0 External Wall Insulation, R3.5 Ceiling Insulation

Table 3: Area Schedule

Unit	Represented Units	Subfloor	Conditioned Area (m^2)	Unconditioned Area (m^2)	Wall Area (m^2)	Window Area (m^2)	Skylight
1	16,25,32,39	None	110.9	0.0	138.6	37.1	0.0
2		None	105.8	0.0	136.5	34.6	0.0
3	4	None	69.7	0.0	96.9	12.0	0.0
5		None	95.0	0.0	119.3	18.8	0.0
6		None	95.8	0.0	117.9	24.5	0.0
7		None	60.8	0.0	87.6	11.5	0.0
8		None	66.7	0.0	94.6	11.0	0.0
9		None	59.9	0.0	87.1	11.5	0.0
10		None	102.8	0.0	128.0	31.2	0.0
11	19,28,35,42	None	107.7	0.0	154.3	37.4	0.0
12	21	None	113.5	0.0	141.1	36.2	0.0
13	22	None	89.9	0.0	117.8	20.7	0.0
14	23	None	87.1	0.0	117.7	20.7	0.0
15	24	None	123.6	0.0	147.9	56.6	0.0
17	26,33,40	None	101.0	0.0	151.1	34.6	0.0
18	27,34,41	None	101.9	0.0	152.0	36.4	0.0
20	29,36,43	None	90.4	0.0	124.6	19.8	0.0
30	37	None	92.0	0.0	124.5	19.8	0.0
31	38	None	113.6	0.0	143.1	35.7	0.0
44		None	184.7	11.1	241.1	80.6	0.0
45		None	170.7	11.4	240.9	78.7	0.0

4. ENERGY

The proposed The Esplanade, Ettalong Beach development has achieved the mandatory BASIX Energy target of 20%. For details of the requirements necessary to achieve this target, please refer to the BASIX Certificate No. 289673M provided for this submission.

Below is the summary of the requirements:

- Central Hot Water System (HWS):
  - Gas-fired Boiler. External piping to be insulated with R0.75 (~32mm)
- 20kW (peak) Photovotaic System.
- Lift to use geared traction with VVAC motor.
- No Pool Heating is to be installed.
- Gas sauna with manual on/timer off.
- Common Area Ventilation:
  - Indoor Pool: Supply & Exhaust controlled by time clock or BMS.
  - Gym: Supply & Exhaust controlled by time clock or BMS.
  - Carpark: Supply & exhaust with CO monitor and VSD fan
  - Lift Motor Room and Plant/Services Room: Exhaust only running continuously.
  - Garbage Room: Exhaust only
  - Ground floor lobby: Supply & Exhaust controlled by time clock or BMS.
  - Other hallways and lobbies: Supply & Exhaust controlled by time clock or BMS.
- Common Area lighting:
  - Indoor Pool and/or Spa Area: Fluorescent lights with manual on/off.
  - Gym: Fluorescent lights with manual on/off.
  - Carpark: Fluorescent lights with motion sensors
  - Lift: Compact Fluorescent lights and must be connected to lift call buttons
  - Garbage Room: Compact Fluorescent lights with motion sensors
  - Plant or Services Room: Compact Fluorescent lights with manual on/off
  - Ground floor lobby: Compact Fluorescent lights with daylight sensors and motion sensors
  - Other hallways and lobbies: Compact Fluorescent lights with daylight sensors and motion sensors
- Ventilation for dwellings:
  - Kitchen Exhaust: Individual fan, not ducted, with manual on/off switch.
  - Bathroom & Laundry: Individual fan, ducted to roof or façade, with manual on/off switch.
- Heating & Cooling: No heating or cooling system is to be installed for all dwellings.
- All dwellings light fittings (including the main light fitting): at least 80% of light fittings in all kitchen, bathrooms, laundries, hallways, bedrooms and at least 1 living areas to use Fluorescent or LED lights with dedicated fittings.
- All dwellings must install:
  - Gas cooktop and gas oven.
  - 4.5-Star (Energy Rating) refrigerator, 4-Star (Energy Rating) clothes washer and 3-Star (Energy Rating) clothes dryer.
  - Well-ventilated fridge space.
  - Private indoor clothes drying lines.

5. SUMMARY

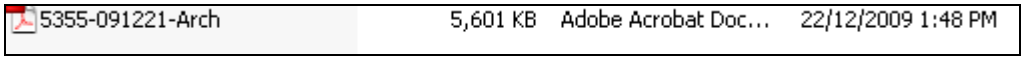
The proposed development has been assessed in terms of its passive energy design (thermal comfort) using the Nationwide House Energy Rating scheme (NatHERS). The proposed development has also been assessed in terms of its ability to conserve water and also to minimise energy consumption via appliances and hot water etc. With the recommendations contained within this report we find that the proposed development is able to achieve a BASIX certificate. For further details, please refer to the BASIX Certificate 289673M provided for this submission.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

6. ARCHITECTURAL DRAWINGS

The environmental assessment carried out in this report was based on the following architectural drawings supplied by Kann Finch Group.



This Report Has Been Prepared for

KANN FINCH GROUP

By

VIPAC ENGINEERS & SCIENTISTS Ltd

BASIX Certificate

Certificate number: 289673M

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 29/06/2009 published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General
Date of issue: Thursday, 14 January 2010

NSW GOVERNMENT | Planning

Score

- ✓ Water: 47 (Target 40)
- ✓ Thermal comfort: pass (Target pass)
- ✓ Energy: 20 (Target 20)

Description of project

Project address	
Project name	Mixed use Ettalong Beach
Street address	218 Memorial Avenue Ettalong Beach 2257
Local Government Area	Gosford City Council
Plan type and plan number	deposited 10650
Lot no.	111
Section no.	-
Project type	
No. of unit buildings	1
No. of units in unit buildings	45
No. of attached dwelling houses	0
No. of separate dwelling houses	0
Site details	
Site area (m²)	3158
Roof area (m²)	1920
Non-residential floor area (m²)	-
Residential car spaces	81
Non-residential car spaces	-
Common area landscape	
Common area lawn (m²)	0
Common area garden (m²)	0
Area of indigenous or low water use species (m²)	0
Assessor details	
Assessor number	20754
Certificate number	12345678
Climate zone	15

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Description of project

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

Unit building - Building1, 45 dwellings, 7 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1	2	110.9	0.0	0	0
5	2	95.0	0.0	0	0
9	1	59.9	0.0	0	0
13	2	89.9	0.0	0	0
17	2	101.0	0.0	0	0
21	2	113.5	0.0	0	0
25	2	110.9	0.0	0	0
29	3	90.4	0.0	0	0
33	2	101.0	0.0	0	0
37	2	92.0	0.0	0	0
41	2	101.9	0.0	0	0
45	3	170.7	11.4	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
2	1	105.8	0.0	0	0
6	2	95.8	0.0	0	0
10	1	102.8	0.0	0	0
14	2	87.1	0.0	0	0
18	2	101.9	0.0	0	0
22	2	89.9	0.0	0	0
26	2	101.0	0.0	0	0
30	2	92.0	0.0	0	0
34	2	101.9	0.0	0	0
38	2	113.6	0.0	0	0
42	2	107.7	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
3	1	69.7	0.0	0	0
7	2	60.8	0.0	0	0
11	2	107.7	0.0	0	0
15	2	123.6	0.0	0	0
19	2	107.7	0.0	0	0
23	2	87.1	0.0	0	0
27	2	101.9	0.0	0	0
31	2	113.6	0.0	0	0
35	2	107.7	0.0	0	0
39	2	110.9	0.0	0	0
43	3	90.4	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
4	1	69.7	0.0	0	0
8	2	66.7	0.0	0	0
12	2	113.5	0.0	0	0
16	2	110.9	0.0	0	0
20	3	90.4	0.0	0	0
24	2	123.6	0.0	0	0
28	2	107.7	0.0	0	0
32	2	110.9	0.0	0	0
36	3	90.4	0.0	0	0
40	2	101.0	0.0	0	0
44	3	184.7	11.1	0	0

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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)
Indoor pool &/or spa area (No. 1)	206
Lift car (No. 1)	-
Garbage room (No. 1)	54
Hallway/lobby type (No. 1)	700

Common area	Floor area (m²)
Gym (No. 1)	75
Lift car (No. 2)	-
Plant or service room (No. 1)	300

Common area	Floor area (m²)
Car park area (No. 1)	3111
Switch room (No. 1)	9
Ground floor lobby type (No. 1)	58

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Schedule of BASIX commitments

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

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

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

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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 unit building - 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.	✓	✓	✓

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	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	4 star	5 star	5 star	no	-	-	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
All dwellings	central water tank (no. 1)	See central systems	See central systems	no	yes	no	no	no
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.		✓	✓

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(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, not ducted	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
2, 3, 4, 9, 10	-	-	-	-	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

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	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
20, 29, 36, 43	-	-	-	-	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes
1, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 37, 38, 39, 40, 41, 42, 44, 45	-	-	-	-	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

	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 & gas oven	4.5 star	yes	-	4 star	3 star	yes	no

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(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	74.6	11.1
5	82.7	15.2
6	66.2	13.6
7	95.1	8.4
8	85.1	11.5

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	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
9	62.3	7.7
10	63.6	6.9
42	52.9	26.2
44	49.7	46.5
45	46.8	46
3, 4	71.2	8.8
12, 21	95.2	12.5
13, 22	54.9	16.1
14, 23	84.2	10.5
15, 24	51.2	14.5
30, 37	70	20
31, 38	68.5	19
11, 19, 28, 35	52.9	26.6
17, 26, 33, 40	75.5	8.1
18, 27, 34, 41	56.2	8.1
20, 29, 36, 43	88.9	32.5
All other dwellings	55.1	38

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(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	3 star	4 star	5 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	180000	To collect run-off from at least: - 1920 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 0 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Pool (No. 1)	Volume: 90 kLs	Location: Indoor pool &/or spa area (No. 1)	-

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(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.		✓	✓
(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
Indoor pool &/or spa area (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	fluorescent	manual on / manual off	No
Gym (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	fluorescent	manual on / manual off	No
Car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	motion sensors	No
Lift car (No. 1)	-	-	compact fluorescent	connected to lift call button	No
Lift car (No. 2)	-	-	compact fluorescent	connected to lift call button	No
Switch room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Garbage room (No. 1)	ventilation exhaust only	-	compact fluorescent	motion sensors	No
Plant or service room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Ground floor lobby type (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	daylight sensor and motion sensor	No

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Central energy systems	Type	Specification
Central hot water system (No. 1)	gas-fired boiler	Piping insulation (ringmain & supply risers): (a) Piping external to building: R0.75 (~32 mm);
Lift (No. 1)	geared traction with V V A C motor	Number of levels (including basement): 9
Lift (No. 2)	geared traction with V V A C motor	Number of levels (including basement): 9
Pool (No. 1)	Heating source: no heating	Pump controlled by timer: no
Sauna (No. 1)	Heating source: gas	Efficiency measure: manual on / timer off

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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	3 star	4 star	5 star	no common laundry facility

(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.		✓	✓
(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.	✓	✓	✓

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Central energy systems	Type	Specification
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 20 peak kW

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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).

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