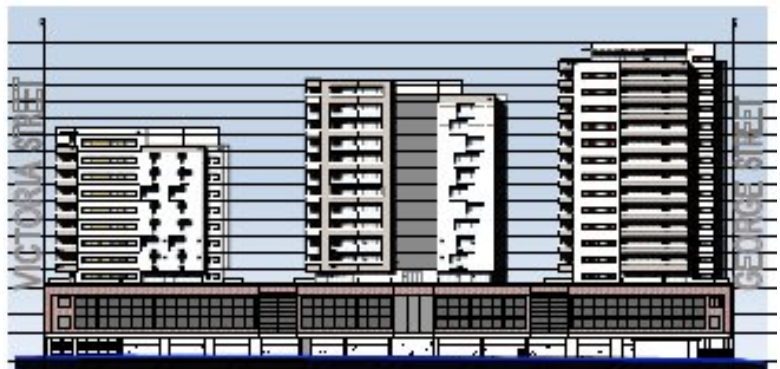


Holdmark Constructions

Elsie, George and Victoria Streets, Burwood

BASIX Assessment

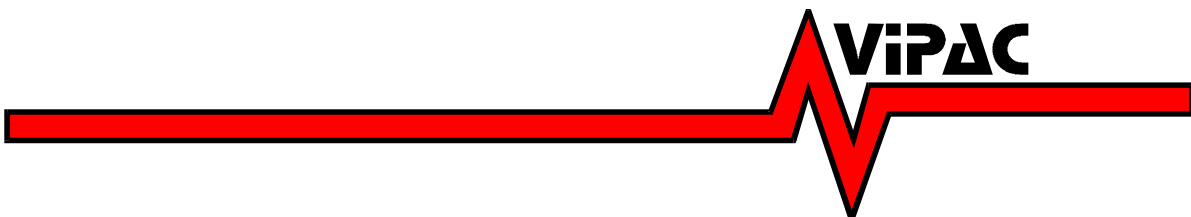


Report No. 20C-06-0038-TRP-247481-10

Vipac Engineers & Scientists Ltd

Sydney, NSW

12th May 2011





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EXECUTIVE SUMMARY

VIPAC Engineers & Scientists Ltd. has been commissioned by Holdmark Constructions to assess the interaction of the proposed developments with the local environment in terms of BASIX compliance.

The site is located on a block bounded by existing developments adjoining the site. George Street runs on the southern of the site. The proposed development will comprise of 3 buildings (Block A, B & C) above a podium which contains ground level + 2 levels of retail and commercial spaces. Block A contains 15 levels of residential apartments, Block B contains 12 levels of residential apartments, Block C contains 11 levels of residential apartments.

Apartments within the development will be of single storey units. The apartments will be a mix 1, 2 and 3 bedrooms. Each apartment will include balcony/terrace space.

Residential units 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 (achieving Water target of 40% and Energy target of 20%). For further details, please refer to the BASIX Certificate provided for this DA 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.



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1. INTRODUCTION

BASIX is a web-based planning tool designed to assess the potential performance of new homes with respect to 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. From 1st July 2006, BASIX has set targets so that each new residential development will use 40% less drinking-quality water and produce less greenhouse gas emissions than average NSW homes of the same type (target varies over Zones and building types, please refer to: http://www.basix.nsw.gov.au/information/common/pdf/alts_adds_req/energy_fact_sheet.pdf).

NatHERS is Australian designed software used for assessing the thermal performance of residential units and houses in New South Wales and can be used to assess the thermal comfort of dwellings under the BASIX scheme if the deemed to comply method is not suitable. NatHERS 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. Heating and cooling loads for the development have been determined using NatHERS software.

2. WATER

The proposed development has achieved the BASIX Water target of 40%. For details of the requirements necessary to achieve the 40% target, please refer to the BASIX Certificate No. 227038M_06 for Building A, BASIX Certificate No. 227061M_04 for Building B, and BASIX Certificate No. 227122M_04 for Building C provided for this DA submission.

Overall requirements:

- Landscaping size: 91m² lawn and 735m² garden (516m² of the garden must be indigenous/low water use).
- A 15,000 Litre Rainwater tank, collecting from all tower roof areas.
- Irrigation of all landscaping areas uses water from Rainwater tank.
- 3 star (Water Rating) toilets and taps to all non-residential (common areas) bathrooms.
- 3 star (Water Rating) showerheads, 4 star (Water Rating) toilets and 6 star (Water Rating) kitchens and bathrooms taps to all apartments.
- 4-star (Water Rating) Dishwashers must be installed in all apartments.
- 4-star (Water Rating) Washing machine must be installed in each of the following apartments: A1701 – A1704, B1301 – B1303, B1401 – B1403, C1201 – C1205 and C1301 – C1304.



3. THERMAL COMFORT

3.1. NATHERS MODELLING ASSUMPTIONS

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

The "base-case" 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 (NATHERS Model)

Element	Material	Detail
External walls	Concrete internally insulated	
	Insulation	Air Cell Retrosshield: Proxy foil + R1.0
	Light colour	< 0.475 absorptance
Internal walls	Plasterboard	
Windows	Single glazed clear	with Holland Blinds (NatHERS default)
	Aluminium frame	
Roof	Concrete	Medium colour (0.475 – 0.7 absorptance)
	Insulation	Foil +R1.0 to exposed areas only
Ceilings	Plasterboard	
	Insulation	None
Floors	Concrete slab	200 mm concrete
	Carpet and tiles covering	15mm total thickness (carpet + underlay)



3.2. NATHERS RESULTS (THERMAL COMFORT)

Energy summary reports for each modelled residential apartment 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 unit to achieve the heating and cooling loads required by BASIX.

Table 2: NatHERS Energy Consumption Results and Additional Treatments

Unit	Represented Units	Heating Load (MJ/m ²)	Cooling Load (MJ/m ²)	Heating Load Caps (MJ/m ²)	Cooling Load Caps (MJ/m ²)	Pass/Fail	Additional Treatment
A301	A401 - A1501	53.4	39.2	132.4	68.2	Pass	None
A302		44.6	50.6	140.3	72.2	Pass	Performance glass of U-value 5.76 & SHGC 0.48 to all west glazing
A303		26.5	31.4	136.3	70.2	Pass	None
A304	A404 - A1504	34.7	7.1	139.8	72.0	Pass	None
A305	A405 - A705	59.6	16.7	132.0	68.0	Pass	None
A306	A406 - A1506	63.4	8.8	132.8	68.4	Pass	None
A307	A407 - A707	88.4	14.4	131.5	67.7	Pass	None
A402	A502 - A1502	61.3	8.4	139.5	71.9	Pass	None
A403	A503 - A1503	23.4	17.0	134.0	69.0	Pass	None
A805	A905 - A1505	59.6	15.9	132.0	68.0	Pass	None
A807	A907 - A1607	88.4	13.8	131.5	67.7	Pass	None
A1601		56.2	43.1	132.4	68.2	Pass	None
A1602		63.4	9.6	139.5	71.9	Pass	None
A1603		32.9	17.5	134.0	69.0	Pass	None
A1604		29.2	10.3	139.8	72.0	Pass	None
A1605		56.0	28.8	132.0	68.0	Pass	None
A1606		68.5	9.4	132.8	68.4	Pass	None
A1701		115.2	47.0	134.6	69.3	Pass	Performance glass of U-value 5.76 & SHGC 0.48 to all west glazing
A1702		106.4	53.2	131.9	68.0	Pass	None
A1703		112.0	37.0	129.4	66.7	Pass	None
A1704		103.7	33.0	131.5	67.7	Pass	None
B301		26.4	23.7	132.7	68.4	Pass	None
B302	B402, B502, B602, B702	73.3	23.8	132.7	68.4	Pass	None
B303	B403, B503, B603	55.3	9.1	135.0	69.6	Pass	None
B304	B404, B504	69.4	18.9	138.3	71.3	Pass	None
B305		59.6	22.1	138.0	71.1	Pass	None
B401	B501, B601, B701, B801, B901, B1001, B1101, B1201, B1301	32.0	23.5	131.5	67.7	Pass	None
B405	B505	59.6	11.9	138.0	71.1	Pass	None
B604		92.2	35.2	138.3	71.3	Pass	None



Unit	Represented Units	Heating Load (MJ/m ²)	Cooling Load (MJ/m ²)	Heating Load Caps (MJ/m ²)	Cooling Load Caps (MJ/m ²)	Pass/Fail	Additional Treatment
B605		84.9	28.0	138.0	71.1	Pass	None
B703	B803, B903, B1003, B1103, B1203, B1303	62.6	8.0	134.2	69.1	Pass	None
B802	B902, B1002, B1102, B1202, B1302	73.3	21.8	132.7	68.4	Pass	None
B1401		55.1	47.0	131.4	67.7	Pass	None
B1402		93.2	40.8	132.7	68.4	Pass	None
B1403		85.0	22.4	134.2	69.1	Pass	None
C301	C401, C501, C601, C701, C801, C901, C1001, C1101, C1201	53.2	18.2	134.6	69.4	Pass	None
C302		45.8	12.8	134.6	69.4	Pass	None
C303	403, 503, 603, 703	74.8	33.3	133.6	68.8	Pass	None
C304		88.7	12.1	132.3	68.2	Pass	None
C305		67.1	35.1	132.2	68.1	Pass	None
C306		90.7	22.1	137.2	70.7	Pass	None
C402	C502, C602, C702, C802, C902, C1002, C1102, C1202	45.8	12.8	134.6	69.4	Pass	None
C404	C504	88.7	11.6	132.3	68.2	Pass	None
C405	C505	79.4	5.9	136.0	70.0	Pass	None
C406	C506	130.6	45.9	141.0	72.7	Pass	None
C407	C507	42.4	10.9	140.9	72.6	Pass	None
C604		94.4	17.7	132.3	68.2	Pass	None
C605		95.3	13.3	136.0	70.0	Pass	None
C606		134.6	39.2	141.0	72.7	Pass	None
C607		43.3	11.4	140.9	72.6	Pass	None
C704		86.0	48.8	139.7	71.9	Pass	None
C705	C805, C905, C1005, C1105	46.2	4.5	141.0	72.6	Pass	None
C706	C806, C906, C1006, C1106, C1205	59.9	18.4	138.6	71.4	Pass	None
C803	C903, C1003, C1103, C1203	74.8	30.8	133.6	68.8	Pass	None
C804	C904, C1004, C1104	86.0	43.5	139.7	71.9	Pass	None
C1204		77.4	12.7	132.1	68.1	Pass	None
C1301		77.2	38.4	134.6	69.4	Pass	None
C1302		68.9	22.0	134.6	69.4	Pass	None
C1303		96.6	45.4	133.6	68.8	Pass	None
C1304		99.3	28.6	132.1	68.1	Pass	None
C1305		73.7	37.9	141.6	72.9	Pass	None



Table 3: Area Schedule

Unit	Represented Units	Sub-floor	Conditioned Area (m ²)	Unconditioned Area (m ²)	Wall (m ²)	Window (m ²)	Skylight (m ²)
A301	A401 - A1501	None	104.9	0.0	36.0	26.0	0.0
A302		None	55.5	0.0	0.5	18.6	0.0
A303		None	76.3	0.0	27.9	21.3	0.0
A304	A404 - A1504	None	57.7	0.0	6.4	12.5	0.0
A305	A405 - A705	None	108.4	0.0	26.7	33.0	0.0
A306	A406 - A1506	None	101.3	0.0	2.5	21.3	0.0
A307	A407 - A707	None	113.7	0.0	49.3	29.0	0.0
A402	A502 - A1502	None	59.2	0.0	11.7	14.0	0.0
A403	A503 - A1503	None	92.1	0.0	31.9	21.3	0.0
A805	A905 - A1505	None	108.4	0.0	26.7	33.0	0.0
A807	A907 - A1607	None	113.7	0.0	49.3	29.0	0.0
A1601		None	104.9	0.0	36.0	26.0	0.0
A1602		None	59.2	0.0	11.7	14.0	0.0
A1603		None	92.1	0.0	31.9	21.3	0.0
A1604		None	57.7	0.0	6.4	12.5	0.0
A1605		None	108.4	0.0	26.7	33.0	0.0
A1606		None	101.3	0.0	2.5	21.3	0.0
A1701		None	87.5	0.0	28.2	28.3	0.0
A1702		None	109.2	0.0	20.5	47.0	0.0
A1703		None	136.7	0.0	21.9	50.8	0.0
A1704		None	113.7	0.0	49.3	29.0	0.0
B301		None	113.8	0.0	28.4	33.7	0.0
B302	B402, B502, B602, B702	None	102.0	0.0	23.9	38.8	0.0
B303	B403, B503, B603	None	84.6	0.0	16.6	14.5	0.0
B304	B404, B504	None	65.0	0.0	25.4	17.4	0.0
B305		None	66.5	0.0	25.2	17.2	0.0
B401	B501, B601, B701, B801, B901, B1001, B1101, B1201, B1301	None	113.4	0.0	34.5	35.8	0.0
B405	B505	None	66.5	0.0	25.2	17.2	0.0
B604		None	65.0	0.0	25.4	17.2	0.0
B605		None	66.5	0.0	25.2	17.2	0.0
B703	B803, B903, B1003, B1103, B1203, B1303	None	90.7	0.0	35.2	14.5	0.0
B802	B902, B1002, B1102, B1202, B1302	None	102.0	0.0	23.9	38.8	0.0
B1401		None	113.4	0.0	34.5	35.8	0.0
B1402		None	102.0	0.0	23.9	38.8	0.0
B1403		None	90.7	0.0	35.2	14.5	0.0
C301	C401, C501, C601, C701, C801, C901, C1001, C1101, C1201	None	87.2	0.0	28.2	24.5	0.0
C302		None	87.2	0.0	9.1	22.0	0.0
C303	403, 503, 603, 703	None	95.1	0.0	18.1	40.0	0.0
C304		None	105.8	0.0	27.9	27.5	0.0



Unit	Represented Units	Sub-floor	Conditioned Area (m ²)	Unconditioned Area (m ²)	Wall (m ²)	Window (m ²)	Skylight (m ²)
C305		None	106.9	0.0	39.8	31.8	0.0
C306		None	70.5	0.0	3.8	24.6	0.0
C402	C502, C602, C702, C802, C902, C1002, C1102, C1202	None	87.2	0.0	9.1	22.0	0.0
C404	C504	None	105.8	0.0	27.9	27.5	0.0
C405	C505	None	78.4	0.0	13.5	16.3	0.0
C406	C506	None	52.4	0.0	21.2	28.8	0.0
C407	C507	None	53.1	0.0	12.7	10.3	0.0
C604		None	105.8	0.0	27.9	27.5	0.0
C605		None	78.4	0.0	13.5	16.3	0.0
C606		None	52.4	0.0	21.2	28.8	0.0
C607		None	53.1	0.0	12.7	10.3	0.0
C704		None	54.4	4.1	15.7	22.1	0.0
C705	C805, C905, C1005, C1105	None	52.5	0.0	13.8	7.8	0.0
C706	C806, C906, C1006, C1106, C1205	None	63.6	0.0	26.7	15.4	0.0
C803	C903, C1003, C1103, C1203	None	95.1	0.0	18.1	40.0	0.0
C804	C904, C1004, C1104	None	54.4	4.1	15.7	22.1	0.0
C1204		None	107.5	0.0	24.0	25.9	0.0
C1301		None	87.2	0.0	28.2	24.5	0.0
C1302		None	87.2	0.0	9.1	22.0	0.0
C1303		None	95.1	0.0	18.1	40.0	0.0
C1304		None	107.5	0.0	24.0	25.9	0.0
C1305		None	50	0.0	11.8	13.9	0.0



4. ENERGY

The proposed development has achieved the BASIX Energy target of 20%. For details of the requirements necessary to achieve the 20% target, please refer to the BASIX Certificate No. 227038M_06 for Building A, BASIX Certificate No. 227061M_04 for Building B, and BASIX Certificate No. 227122M_04 for Building C provided for this DA submission.

Overall requirements:

- Central Hot Water system: Gas Fired Storage (manifolded), with R0.6 (25mm) internal piping insulations.
- Lifts to use Gearless Traction with VVVF motor.
- Common Areas ventilations:
 - Plant room at Ground level ventilation (exhaust only) is continuous.
 - Plant rooms at roof levels are naturally ventilated.
 - Garbage room ventilation (exhaust only).
 - Ground floor lobbies use no mechanical ventilation.
 - Other levels' hallways and lobbies, and other internal common areas use ventilation (supply only).
- Common Area lighting:
 - Lift uses Fluorescent lights;
 - Garbage rooms and Plant rooms use Fluorescent lights with manual on/off switch.
 - Lobbies and Hallways use Compact Fluorescent lights with motion sensors.
- All apartments use Central Hot Water System.
- Ventilation for apartments:
 - Bathrooms use individual fan, ducted to façade/roof interlocked to light.
 - Laundries use individual fan, ducted to façade/roof interlocked to light.
- All apartments install 1-phase Air-conditioning (4-Star) for cooling and heating.
- All dwellings light fittings (including the main light fitting): at least 80% of light fittings in all laundries, bedrooms and at least 1 living areas to use Fluorescent or LED lights with dedicated fittings.
- All apartments must install:
 - Gas cooktop and electric oven;
 - Well-ventilated fridge space.



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 (achieving Water target of 40% and Energy target of 20%). For further details, please refer to the BASIX Certificate No. 227038M_06 for Building A, BASIX Certificate No. 227061M_04 for Building B, and BASIX Certificate No. 227122M_04 for Building C provided for this DA 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.

ARCHITECTURAL DRAWINGS

The environmental assessment carried out in this Report was based on the following architectural drawings prepared by Turner + Associates Architects.

Drawing Title	Drawing No.	Revision No.
Site/roof Plan	DA10	J
Level 3	DA11	J
Level 4 – 6	DA12	I
Level 7	DA13	I
Level 8 – 10	DA13.1	I
Level 11	DA14	H
Level 12	DA15	J
Level 13	DA16	I
Level 14	DA17	I
Level 15 – 16	DA18	H
Level 17	DA19	H
Tower C: North & South Elevations	DA20	H
East Elevations	DA21	H
Tower A: North & South Elevations	DA22	F
West Elevations	DA23	H
Tower B: North & South Elevations	DA24	G
Section AA	DA30	C
Section BB Tower A	DA31	B
Section CC Tower B	DA32	C
Section DD Tower C	DA33	C

**This Report Has Been Prepared
For
Holdmark Constructions
by
VIPAC ENGINEERS & SCIENTISTS Ltd**

