Assessor Certificate

Multiple Dwellings

Certificate Version 6.1. Prior versions not valid after 1 March 2006

Issued in accordance with the requirements of
BASIX Thermal Comfort Simulation Method

14/09/2012 V By Crown

Assessor

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Project

Address: 45 Macquarie Street PARRAMATTA NSW 2150

Applicant: Crown Group **LGA:** Parramatta City Council

Assessment:

Date: 13-Sep-2012 **File Ref:** V By Crown 1.01 **Software:** BERS **Version:** 4.2

Documentation:

All details, upon which this assessment has been based, are included in the project documentation that has been stamped and signed by the Assessor issuing this certificate, as identified below:

Thermal Performance Spec:
Attached, Affixed to drawings Page#: DA2001

Drawings: (Title, Ref.#, Revision, Issue date, etc)
DA2001 - DA2006, DA2099, DA2100 - DA2129, DA2200, DA3100, DA3103,

Building Specifications: (Title, Ref.#, Revision, Issue date, etc)

Affix assessor stamp

ABSA Assessor Certificate **Assessor # 20940** **Certificate # 81578982** **Issued:14-Sep-2012**

Thermal performance specifications Page 1

Unit number(s)	Certificate number	Floor area (m2)		Predict.loads(area adjusted J/m2/y		Consessions	Qualify for ventilation bonus
		Cond.	Uncond.	Heat	Cool (Sens & Lat)		
1.01	81578982	87	0	18	38		
1.02+3	24126153	40	0	20	37		
1.04	65526600	75	6	28	38		
1.05	25136915	74	6	29	40		
1.08	60442151	78	0	22	40		
11.16	97628431	58	0	47	20		
11.17	92120531	58	0	50	16		
11.18	79726509	58	0	50	22		
11.19	42430184	62	0	23	18		
11.20	96954590	62	0	13	39		
11.21	26137267	62	0	17	36		
11.22	98800221	84	0	29	12		
12.09+13	99236356	89	0	29	13		
12.10+13	66987442	83	0	30	14		
12.11+13	44166554	83	0	33	11		
12.16+1	60534627	37	0	39	38		

ABSA Assessor Certificate	Assessor # 20940	Certificate # 97473348	Issued:14-Sep-2012

Thermal performance specifications Page 2

Unit number(s)	Certificate number	Floor area (m2)		Predict.loads(area adjusted J/m2/y		Consessions	Qualify for ventilation bonus
		Cond.	Uncond.	Heat	Cool (Sens & Lat)		
12.17+12	97473348	43	0	13	32		
12.18+12	39890995	43	0	13	33		
14.16+10	38409765	86	0	26	21		
14.17+10	16631256	50	0	32	17		
15.01+10	25701257	62	0	33	13		
15.02+10	85226285	90	0	24	16		
15.03+10	58193514	81	0	23	16		
15.04+5	25358916	53	0	18	19		
15.05+5	66297247	54	0	38	12		
15.06+10	52547860	99	0	15	11		
15.07+5	25614180	54	0	39	12		
15.08+5	12655703	53	0	19	19		
15.12+9	66054325	61	0	33	20		
15.13+9	60250871	61	0	35	17		
15.14+9	80691449	61	0	35	17		
15.15+9	74616922	61	0	45	19		
2.01	45698891	87	0	22	35		
2.02+3	78074625	40	0	29	33		
2.04	32693081	74	6	35	36		
2.05	10019697	74	6	36	38		
2.08	64672547	78	0	27	37		
21.04+5	97411841	107	0	34	14		
21.06+5	15284789	107	0	36	15		
25.10	73726604	61	0	39	18		
25.11	70632164	61	0	49	18		
25.12	93930976	61	0	39	19		
25.13	60306013	61	0	49	18		
25.14	35325303	86	0	33	20		
25.15	53894566	50	0	35	17		
25.16	39427800	43	0	19	20		
25.17	46416260	43	0	11	22		
26.01	92433631	53	0	30	11		
26.02	42807507	75	0	33	12		
26.03	96435412	65	0	38	23		
26.07	70743278	71	0	44	11		
26.08	51142025	71	0	42	12		
26.09	48713300	71	0	49	12		
27.01	71658848	51	0	30	11		
27.02	93454791	64	0	26	17		
27.03	73476874	59	0	30	20		
27.04	35391799	146	21	24	28		
27.05	98421626	144	0	5	13		
27.06	70157059	146	21	27	29		
27.07	64859021	98	0	43	12		
27.08	26499088	98	0	45	12		
27.09	54744596	98	0	48	13		
3.01+11	62243278	62	0	29	19		
3.02+11	16074074	90	0	23	17		
3.03+11	71315859	81	0	32	15		
3.04+3	64030221	53	0	22	21		
3.05+3	60598315	54	0	24	30		
3.06+3	19809112	99	0	11	16		
3.07+3	60573836	54	0	33	14		
3.08+3	87711116	53	0	13	40		

Unit number(s)	Certificate number	Floor area (m2)		Predict.loads(area adjusted J/m2/y		Consessions	Qualify for ventilation bonus
		Cond.	Uncond.	Heat	Cool (Sens & Lat)		
3.09	69914785	89	0	29	13		
3.10	72908510	89	0	33	13		
3.11	91215370	89	0	40	13		
3.12+11	10801288	61	0	27	28		
3.13+11	72008214	61	0	34	29		
3.14+11	38106757	61	0	29	25		
3.15+11	48078554	61	0	40	28		
3.16+7	51868064	58	0	41	23		
3.17+7	47411213	58	0	49	24		
3.18+7	96052135	58	0	45	22		
3.19+7	76181433	62	0	19	20		
3.20+7	75361168	62	0	13	41		
3.21+7	18096677	62	0	13	41		
3.22+7	89683681	84	0	32	12		
3.23+8	47346446	55	0	24	23		
3.24+8	90481091	43	0	9	35		
4.09+7	74699783	83	0	25	17		
4.10+7	92810180	83	0	28	17		
4.11+7	53402448	83	0	31	15		
7.04+7	52166322	53	0	22	15		
7.05+7	43959703	54	0	32	14		
7.06+7	70658803	99	0	12	14		
7.07+7	73353726	54	0	33	14		
7.08+7	40561040	53	0	16	22		

V by Crown
NatHERS Assessment

13 September 2012

ADV090660E

Client

Crown Group

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Executive Summary

WSP Built Ecology assessed the thermal comfort of the dwellings in the V by Crown building at 45 Macquarie Street, Parramatta. This assessment was to determine if compliance with the thermal comfort section of NSW Government Building Sustainability Index ("BASIX") is achieved:

- Cooling loads must be below 41MJ/m^2
- Heating loads must be below 50MJ/m^2

The proposed development comprises of 504 Class 2 dwellings on top of a retail and commercial podium. There are communal residential facilities including a gym and swimming pool and a commercial function centre. The retail and commercial portions of the development are not part of this assessment.

Thermal comfort was assessed using BERS Pro, produced by Solar Logic which is computer software used to simulate the thermal performance of dwellings in Australian climates. It has been developed as a residential energy rating tool for the Nationwide House Energy Rating Scheme ("NatHERS"), and has achieved provisional accreditation to the NatHERS Software Accreditation Protocol.

Based on the modelling performed, the dwellings in V by Crown pass the minimum requirements of BASIX, subject to the details set out in this report being implemented in the design.

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LIST OF TABLES

Issue/Status	Revision	Date Issued	Author	Checked	Approved	Comment
Draft		23/11/11	KWF	RXC	KWF	For review and planning submission

1. Introduction

WSP Built Ecology assessed the thermal comfort of the dwellings in V by Crown, at 45 Macquarie Street, Parramatta. This assessment was to determine if compliance with the thermal comfort section of NSW Government Building Sustainability Index ("BASIX") is achieved.

1.1. BASIX

BASIX is an online tool that is used to rate the energy and water efficiency of residential dwellings in NSW. The tool sets minimum energy and water reduction targets which must be met through the design of the building and the selection of fixtures and fittings.

BASIX applies to all new dwellings including single dwellings, townhouses and low-rise, mid-rise and high-rise developments in NSW. BASIX also applies to all residential alterations and additions with a total cost of works of $100,000 or more and all residential; developments with a total estimated cost of works of $50,000 or more.

Design inputs such as location, size, size, construction material, water source and fittings, to determine the potential energy and water consumption of a new home or dwelling.

BASIX is divided into three sections:

1. Water;
2. Thermal Comfort; and
3. Energy.

Thermal comfort is assessed by simulation, which involves the modeling of each dwelling that is to be assessed by an accredited assessor. This assesses the potential of the dwelling to provide thermal comfort passively, thereby reducing energy requirements for heating and cooling. Annual heating and cooling loads are entered into the BASIX tool to determine if the dwelling passes the maximum heating and cooling loads allowed by the program.

The heating and cooling loads also affect the 'Energy' score with more efficient dwellings performing better in the 'Energy' section. The 'Energy' score is also affected by other inputs such as efficiency of appliances, heating and cooling system selection, hot water systems and also factors such as use of any renewable energy.

1.2. Simulation Software

BERS Pro, produced by Solar Logic is computer software used to simulate the thermal performance of dwellings in Australian climates. It has been developed as a residential energy rating tool for the Nationwide House Energy Rating Scheme ("NatHERS"), and has achieved provisional accreditation to the NatHERS Software Accreditation Protocol.

User inputs such as area uses, orientation, climate zone, building materials and air conditioning requirements are used to calculate heating and cooling loads for the dwelling to see if they are within the limits set by the BASIX tool.

1.3. Sources of Information

This NatHERS assessment has been based on the following architectural design documentation provided by PTW Architects:

- Apartment schedule, dated 7 August 2012;
- Plan drawings DA2001, DA2002, DA2004, DA2006, DA2099 – DA2104, DA2112 – DA214, DA2121, DA2126 – DA2129 and DA2200, dated 31 August 2012;
- Elevation drawings DA3100 – DA3102 and DA3200 , dated 31 August 2012;
- Correspondance between AJ+C architects and WSP Built Ecology; and
- Correspondence between Crown Group and WSP Built Ecology.

1.4. Limitations

The results from the BERS Pro modelling shown within this report are limited in accuracy by the following factors:

- Actual energy consumption will also be dependent on the climate, occupants and their behaviour which the software does not take into account;
- Construction details being as advised by AJ+C architects;
- Orientation and apartment playout being as shown on the drawings.

2. BERS Pro

2.1. Modelling Inputs

This section identifies the inputs for windows, shading and constructions which were used for the BERS Pro modeling on all the dwellings.

2.1.1. Windows

Table 1 identifies the glazing properties (window pane value only, as well as total value) used as part of the BERS Pro models.

Table 1: Window Properties – Building 02

Window Construction Details			Window Pane		Total	
Type	**Glass**	**Frame**	**U-value**	**SHGC**	**U-value**	**SHGC**
Fixed	Dark tinted glass	Alumium	5.82	0.30	6.66	0.28
Fixed	Single glazed clear	Alumium	5.88	0.84	6.57	0..74
Awning windows	Single glazed clear	Alumium	5.88	0.84	6.57	0..74
Glass door	Single glazed clear	Alumium	5.88	0.84	6.57	0..74
Where double glazing has been noted in Table 3, the following parameters apply						
Double glazed fixed	Dark tinted glass	Alumium	3.11	0.31	4.22	0.29
Double glazed operable	Double glazed clear	Alumium	3.17	0.76	4.27	0.67

2.1.2. Shading and blinds

The shading applied to the windows used as part of the BERS Pro models is limited to:

- The overhang of any balconies above each dwelling, built in as eaves;
- Any shading from overshadowing buildings; and
- Any balcony walls between dwellings, built in as shading screens and wing walls.

2.1.3. Constructions

Table 2 identifies the wall, floor, ceiling and roof construction properties used as part of the BERS Pro models.

Table 2 - Construction Properties – Building 02

	Construction	Insulation	Detail
External walls	200mm concrete, lined	R2.4	To provide total R2.76
Party walls (walls between dwellings)	Power panel	R0.7	To provide total R1
Internal walls **(Walls between dwellings and common areas)**	Power panel	R0.7	To provide total R1
Internal walls (Walls within dwellings)	Cavity panel	None	
Roof	Concrete	R2.9	To provide total R3.2
Floors	Concrete	None	Carpet to all habitable spaces, tiles to kitchens and bathrooms
Ceilings	Plasterboard	None	

2.2. Results

This section describes the results from the modeling performed. In summary the current designs of the dwellings have achieved the minimum requirements of BASIX without amendments. Their area corrected heating and cooling loads have been identified in Table 3;

Table 3 - Area corrected heating and cooling loads

Type	Represented Dwellings	Predicted load (MJ/m^2.yr)		
		Heating Load	Cooling Load	Treatment
1	1.01	18.2	38	
2	1.02, 1.03, 1.06, 1.07	20.2	36.9	
3	1.04	27.9	38.4	
3a	1.05	28.9	39.8	
4	1.08	22.3	39.6	
1a	2.01	22.2	35.1	
2a	2.02, 2.03, 2.06, 2.07	29.1	33.3	
3b	2.04	35.1	36.2	
3c	2.05	35.7	38.3	
4a	2.08	26.7	36.8	
5	3.01-14.01	29	19.1	
6	3.02-14.02	22.8	16.7	
7	3.03-14.03	31.5	15	
8	3.04-6.04	21.6	20.6	
8a	3.08-6.08	12.5	40.1	
9	3.05-6.05	23.9	30.3	
9a	3.07-6.07	32.9	14.4	
10	3.06-6.06	11.2	16	
11	3.09	29.2	12.7	
11a	3.10	33.1	12.6	
11b	3.11	39.5	12.7	
12	3.12-14.12	26.6	27.8	
12a	3.13-14.13	34.2	28.6	
12b	3.14-14.14	29.1	24.7	
12c	3.15-14.15	39.5	27.6	
13	3.16-10.16	40.9	22.5	Double glazing to all southern living room window panes
14	3.17-10.17	48.6	24.2	Double glazing to the lower fixed portions of the living room southern windows
13a	3.18-10.18	44.8	22.4	
15	3.19-10.19	19.1	19.6	

15a	3.20-10.20	12.6	40.7	
15b	3.21-10.21	13.1	40.7	
16	3.22-10.22	31.9	12.2	
16a	11.22	29.3	11.8	
17	3.23-11.23	23.9	22.8	
18	3.24-11.24	8.9	35	
8b	7.04-14.04	22.4	14.8	
8c	7.08-14.08	16.3	22.4	
9b	7.05-14.05	32.4	14.1	
9c	7.07-14.07	32.8	14.4	
10a	7.06-14.06	12.4	14.4	
8d	15.04-20.04	17.5	19.4	
8e	15.08-20.08	19	19.1	
9d	15.05-20.05	38.1	11.8	
9e	15.07-20.07	38.8	12.1	
10b	15.06-20.06, 21.05-26.05	15.4	10.6	
11c	4.09-11.09	25.2	17.3	
11d	4.10-11.10	27.8	17.1	
11e	4.11-11.11	30.7	15.2	
13b	11.16	46.8	19.5	Double glazing to all southern living room window panes
13c	11.18	49.9	22	
14a	11.17	50	15.5	Double glazing to the lower fixed portions of the living room southern windows
15c	11.19	22.6	17.7	
15d	11.20	12.6	39.4	
15e	11.21	17.4	35.9	
5b	15.01-25.01	33.2	13.4	
6b	15.02-25.02	23.1	16.1	
7b	15.03-25.03	23.1	15.7	
11f	12.09-20.09, 21.07-25.07	29.2	12.5	
11g	12.10-20.10, 21.08-25.08	30	14	
11h	12.11-20.11, 21.09-25.09	33	10.7	
12d	15.12-20.12, 21.10-24.10	33.1	20	
12e	15.13-20.13, 21.11-24.11	35.4	17.1	
12f	15.14-20.14, 21.12-24.12	35.1	17.1	
12g	15.15-20.15, 21.13-24.13	44.7	18.7	
19	12.16 and 13.16	38.7	37.9	
20	12.17, 13.17, 14.18-20.18, 21.16-24.16	12.9	31.7	4 awning windows required instead ofonly 2
18a	12.18 ,13.18, 14.19-20.19,	12.5	33.2	4 awning windows required instead

	21.17-24.17			ofonly 2
21	14.16-20.16, 21.14-24.14	25.7	21.4	
22	14.17-20.17, 21.15-24.15	31.5	17.2	
12h	25.10	39.4	17.6	
12i	25.11	49.4	18.3	
12j	25.12	38.9	18.6	
12k	25.13	49	17.7	
21a	25.14	32.6	20.4	
22a	25.15	35.3	16.5	
20a	25.16	19.4	20.4	
18b	25.17	11.1	21.6	
23	21.04-26.04	34.4	14.4	
23a	21.06-26.06	36.3	14.6	
24	26.07	44	11.3	
24a	26.08	41.6	12.6	
24c	26.09	48.9	11.6	
25	26.01	29.9	11.4	
26	26.02	32.8	11.8	
27	26.03	37.5	22.9	
28	27.04	24.1	28	
33	27.05	4.5	12.7	
28b	27.06	27	29.3	
29	27.07	43.2	12	Double glaze the eastern windows, all panes
29a	27.08	44.6	12	Double glaze the eastern windows, all panes
29b	27.09	47.9	12.7	Double glaze the eastern windows, all panes
30	27.01	30.4	11.3	
31	27.02	26	17.3	
32	27.03	30.4	19.7	

Table 4 - Dwelling Type Area Schedule – Building 02

Building 02					
Type	**Conditioned Area m²**	**Unconditioned Area m²**	**External Wall Area m²**	**Window area m²**	**Skylight area m²**
1	86.5	0	73.3	28.8	0
2	40.3	0	63.4	11.1	0
3	74.9	6.3	80.1	24.1	0
3a	74.1	6.3	79.1	24.1	0
4	78.4	0	73.9	23.8	0
1a	86.5	0	73.3	28.8	0

2a	40.3	0	63.4	11.1	0
3b	74.1	6.3	79.1	24.1	0
3c	74.3	6.3	79.3	24.1	0
4a	78.4	0	73.9	23.8	0
5	62.1	0	75.4	22.3	0
6	90.1	0	88.3	30.4	0
7	80.7	0	86.8	31	0
8	53	0	67.3	12.6	0
8a	53	0	67.3	12.6	0
9	54.4	0	86.3	27.1	0
9a	54.4	0	86.3	27.1	0
10	98.8	0	93.2	26.7	0
11	88.6	0	80.2	21.9	0
11a	88.6	0	81.1	21	0
11b	88.8	0	79.5	22.8	0
12	60.6	0	68	23.3	0
12a	60.6	0	23.3	34.2	0
12b	60.6	0	69.8	21.5	0
12c	60.6	0	68	23.3	0
13	58.2	0	56.7	32.9	0
14	57.5	0	59.6	29.8	0
13a	58.2	0	58.5	31.1	0
15	62.4	0	71	21.9	0
15a	62.4	0	71.8	21.1	0
15b	62.4	0	72.8	20.1	0
16	83.5	0	105.4	28	0
17	55.4	0	83.6	19	0
18	43.1	0	71.7	10.4	0
8b	53	0	67.3	12.6	0
8c	53	0	67.3	12.6	0
9b	54.4	0	86.3	27.1	0
9c	54.4	0	86.3	27.1	0
10a	98.8	0	93.2	26.7	0
8d	53	0	67.3	12.6	0
8e	53	0	67.3	12.6	0
9d	54.4	0	86.3	27.1	0
9e	54.4	0	86.3	27.1	0
10b	98.8	0	93.2	26.7	0
11c	83.2	0	79.2	30.9	0

11d	83.2	0	80.1	30	0
11e	83.2	0	85.1	25	
13b	58.2	0	56.7	32.9	
13c	58.2	0	55.1	34.5	
14a	57.8	0	63.1	26.5	
15c	62.4	0	71	21.9	
15d	62.4	0	72.8	20.1	
15e	62.4	0	71	21.9	
16a	83.5	0	105.4	28	
5b	62.1	0	75.4	22.3	
6b	90	0	88.3	30.4	
7b	80.7	0	88.6	29.2	
11f	88.6	0	80.2	21.9	
11g	83.2	0	80.1	30	
11h	83.2	0	85.1	25	
12d	60.6	0	68	23.3	
12e	60.6	0	69.8	21.5	
12f	60.6	0	69.8	21.5	
12g	60.6	0	68	23.3	
19	37	0	55.2	16.6	
20	43.1	0	71.7	10.4	
18a	43.1	0	71.7	10.4	
21	86.1	0	83.8	25.8	
22	50.2	0	72.1	21.3	
12h	60.6	0	68	23.3	
12i	60.6	0	68	23.3	
12j	60.6	0	68	23.3	
12k	60.6	0	68	23.3	
21a	86.1	0	83.8	25.8	
22a	50.2	0	72.1	21.3	
20a	43.1	0	71.7	10.4	
18b	43.1	0	71.7	10.4	
23	106.9	0	85.2	40.6	
23a	106.9	0	85.2	40.6	
24	71.1	0	67.2	24.1	
24a	71.1	0	68.1	23.2	
24c	71.1	0	66.3	25	
25	53.2	0	76.9	17.3	
26	74.6	0	72.3	22.7	

27	65	0	72.3	22.7
28	146	0	127.5	70.1
33	143.6	0	138.3	44.8
28b	146.0	0	127.5	70.1
29	98.4	0	108.2	45.2
29a	98.4	0	109.1	44.3
29b	98.4	0	107.3	46.1
30	50.8	0	72.1	16.5
31	63.7	0	69.4	22.9
32	59.3	0	69.1	23.2

3. Conclusion

Based on the BERS Pro modelling performed, the dwellings in V by Crown pass the minimum requirements of BASIX, subject to the details set out in this report being implemented in the design.

These results have been entered into the NatHERS certificate, shown in Appendix A.

APPENDIX A – NatHERS CERTIFICATE

APPENDIX B – BASIX CERTIFICATES

APPENDIX C – STAMPED PLANS