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Thermal Comfort Assessment
Broadway Plaza
No1 The Broadway Punchbowl

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DeiCorp Construtions NSW

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Thermal Comfort Assessment

Broadway Plaza Buildings

No1 The Broadway Punchbowl

PREPARED BY:

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street Lane Cove NSW 2066 Australia

(PO Box 176 Lane Cove NSW 1595 Australia)
T: 61 2 9428 8100 F: 61 2 9427 8200
E: sydney@slrconsulting.com www.slrconsulting.com

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1 INTRODUCTION

SLR Heggies has been engaged by DeiCorp Construtions NSW Pty Ltd to undertake a Thermal Comfort assessment for compliance with BASIX of a proposed residential development at No1 The Broadway Plaza Punchbowl. The assessment forms part of a Development Application to the Canterbury Shire Council.

The proposed residential development comprises of 7 - 6-storey buildings A, B, C, D, E, F and G with a total of 148 apartments. This report covers the thermal modelling of all buildings on the development A through to G

The following report was prepared upon architectural drawings supplied by Architectural and building works on the 20th of January 2012 and revised drawings sent on the 27th of July 2012.

2 ECOLOGICAL SUSTAINABLE DEVELOPMENT

2.1 BERS Pro

2.1.1 Background

BERS Pro software is a tool designed by Solar Logic that uses CSIRO thermal simulation AccuRate engine to assess the thermal performance of residential apartments, townhouses and houses. BERS Pro computer simulation is an officially recognised computer energy rating system by the Department of Planning NSW.

Residential units were assessed for projected thermal performance by the BERS Pro software (Version 4.1), by undertaking the analysis of a representative sample of apartments which encompass all unit types. The total heating and cooling load for an apartment is calculated and then compared to the maximum heating and cooling loads in BASIX. The software has been used to undertake a comparative energy use analysis of the dwelling components of the development to assist in design optimisation for energy efficiency.

2.1.2 BERS Pro Modelling Assumptions

Information supplied by DeiCorp Constructions NSW and Architectural and Building works and the architectural drawings have been utilised in the energy modelling. **Table 1** lists the construction materials used in the assessment of all units within the development.

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 a reflection of the actual operational heating and cooling energy use of the development. 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 can not be determined until a building is occupied and operational.

Table 1 BERS Pro Modelling Assumptions

Element	Material Type	Detail
External walls	Brick Veneer	Medium Colour
Internal walls	Brick with timber stud	Between adjoining apartments/lobby areas
	Hollow Timber stud	Internal apartment walls
Windows	Single glazed Clear Aluminium Frame	NFRC Glazing System (Glass+Frame) values: ⇒ $U \leq 6.57$ and $SHGC = 0.74 \pm 10\%$ Weather stripping fitted on windows and doors
Ceilings	Plasterboard	No insulation below Apartments floors
	Plasterboard	No insulation below roof
Floor	Concrete slab	Carpet (all Living Areas and Bedrooms) Tile (all Bathrooms, Kitchens and Laundries)
	No insulation	
Roof	Metal deck	No insulation, Light Colour

2.2 Thermal Comfort Results

Basix divides areas around Australia into separate zones which compensate for the varying climates in each zone. The location this site falls into, according to the Basix certification, is zone 56. BASIX thermal comfort requirements for developments in Zone 56 are as follow:

- Individual maximum heating and cooling loads of 66 MJ/m²/yr and 59 MJ/m²/yr respectively; and
- The whole development must have a maximum heating and cooling loads of 51 MJ/m²/yr and 45 MJ/m²/yr respectively.

The results of the thermal modelling of individual apartments in buildings A, B, C, D, E, F and G are summarised in **Table 2**. To comply with the BASIX requirements for development in climate zone 56 several recommendations have been made for apartments that exceeded the maximum heating and cooling loads

Table 2 Individual Area Adjusted Heating and Cooling Loads

Unit	Basix Rating	Heating MJ/m ² /yr	Cooling MJ/m ² /yr	Modifications Required	Rating after	Heating MJ/m ² /yr	Cooling MJ/m ² /yr
A.01	2.5	83.3	65.6	R 2 Insulation in all external walls, tinted windows with 0.5 SHGC	3	59.2	52.6
A.02	2.5	115.0	30.0	R 2.5 Insulation in all external walls plus double glazing U=4.25	3	64.4	31.9
A.03	2.5	62.4	67.0	R 1.5 Insulation with reflective foil both sides in all external walls	3	57	55
A.04	2.5	115.0	30.0	R 2.5 Insulation in all external walls plus double glazing U=4.25	3	64.4	31.9
A.05	2.5	62.4	67.0	R 1.5 Insulation with reflective foil both sides in all external walls	3	57	55
A.06	2.5	115.0	30.0	R 2.5 Insulation in all external walls plus double glazing U=4.25	3	64.4	31.9
A.07	2	82.4	55.4	R 1.8 Insulation in all external walls	3	65.5	51.5
A.08	2.5	62.4	67.0	R 1.5 Insulation with reflective foil both sides in all external walls	3	57	55
A.09	2.5	115.0	30.0	R 2.5 Insulation in all external walls plus double glazing U=4.25	3	64.4	31.9
A.10	3.5	45.5	54.5		3.5	45.5	54.5
A.11	2	82.4	55.4	R 1.8 Insulation in all external walls	3	65.5	51.5
A.12	2.5	62.4	67.0	R 1.5 Insulation with reflective foil both sides in all external walls	3	57	55
A.13	2.5	115.0	30.0	R 2.5 Insulation in all external walls plus double glazing U=4.25	3	64.4	31.9
A.14	3.5	45.5	54.5				
A.15	0.5	111.0	60.2	R 2 Insulation in roof, opaque blinds all windows	3	48.1	56.4
A.16	1	135.0	127.0	R 2 Insulation in roof, tinted windows with 0.5 SHGC, opaque blinds all windows	3.5	41	54.8
B.17	2.5	82.6	51.5	R 1.5 Insulation in external walls	3	56.9	51.6
B.18	4	28.5	53.9		4	28.5	53.9
B.19	7.5	11.1	19.4		7.5	11.1	19.4
B.20	3.5	55.1	36.4		3.5	55.1	36.4

B.21	3	71.0	41.6	R 1.5 Insulation in external walls	3.5	61.5	41.4
B.22	2.5	82.6	51.5	R 1.5 Insulation in external walls	3	56.9	51.6
B.23	4	28.5	53.9				
B.24	4	41.1	38.8		4	41.1	38.8
B.25	3.5	55.1	36.4				
B.26	3	71.0	41.6	R 1.5 Insulation in external walls	3.5	61.5	41.4
B.27	2.5	82.6	51.5	R 1.5 Insulation in external walls	3	56.9	51.6
B.28	4	28.5	53.9				
B.29	4	41.1	38.8				
B.30	3.5	55.1	36.4				
B.31	3	71.0	41.6	R 1.5 Insulation in external walls	3.5	61.5	41.4
B.32	2.5	82.6	51.5	R 1.5 Insulation in external walls	3	56.9	51.6
B.33	4	28.5	53.9				
B.34	4	41.1	38.8				
B.35	3.5	55.1	36.4				
B.36	3	71.0	41.6	R 1.5 Insulation in external walls	3.5	61.5	41.4
B.37	2.5	82.6	51.5	R 1.5 Insulation in external walls	3	56.9	51.6
B.38	4	28.5	53.9				
B.39	4	41.1	38.8				
B.40	3.5	55.1	36.4				
B.41	3	71.0	41.6	R 1.5 Insulation in external walls	3.5	61.5	41.4
B.42	1.5	118.2	74.4	R 2 Insulation in roof,	3.5	54.7	48.8
B.43	2.5	91.7	42.5	R 2 Insulation in roof,	4.5	45.9	26
C.44	4	47.0	30.0		4	47	30
C.45	3.5	39.7	54.8		3.5	39.7	54.8
C.46	3	70.4	46.7	R 1.5 in external walls	4	40.8	40.6
C.47	3	47.2	58.2	R 1.5 in external walls, tinted glass 0.5 SHGC, Holland blinds	3.5	47.2	49.4
C.48	3.5	66.0	32.3	R 2 insulation in external walls	3.5	60.6	34.3
C.49	3	70.4	46.7	R 1.5 in external walls	4	40.8	40.6
C.50	3	47.2	58.2	R 1.5 in external walls, tinted glass 0.5 SHGC, Holland blinds	3.5	47.2	49.4
C.51	3.5	66.0	32.3	R 2 insulation in external walls	3.5	60.6	34.3
C.52	3	70.4	46.7	R 1.5 in external walls	4	40.8	40.6
C.53	3	47.2	58.2	R 1.5 in external walls, tinted glass 0.5 SHGC, Holland blinds	3.5	47.2	49.4
C.54	3.5	66.0	32.3	R 2 insulation in external walls	3.5	60.6	34.3
C.55	3	70.4	46.7	R 1.5 in external walls	4	40.8	40.6
C.56	3	47.2	58.2	R 1.5 in external walls, tinted glass 0.5 SHGC, Holland blinds	3.5	47.2	49.4
C.57	3.5	66.0	32.3	R 2 insulation in external walls	3.5	60.6	34.3
C.58	3	63.4	57.8	R 2 Insulation in roof	4	55	26.1
C.59	3	70.7	30.8	R 2 insulation in external walls	3.5	58.5	28.3

C.60	3.5	45.9	76.7	Tinted glass 0.5 SHGC plus Holland blinds	3.5	39.1	58.3
C.61	3	58.7	50.9	R 1.5 Insulation in external walls	3.5	38.6	56.6
C.62	3	70.7	30.8	R 2 insulation in external walls	3.5	58.5	28.3
C.63	3.5	45.9	76.7	Tinted glass 0.5 SHGC plus Holland blinds	3.5	39.1	58.3
C.64	3	58.7	50.9	R 1.5 Insulation in external walls	3.5	38.6	56.6
C.65	3	70.7	30.8	R 2 insulation in external walls	3.5	58.5	28.3
C.66	3.5	45.9	76.7	Tinted glass 0.5 SHGC plus Holland blinds	3.5	39.1	58.3
C.67	3	58.7	50.9	R 1.5 Insulation in external walls	3.5	38.6	56.6
C.68	3	70.7	30.8	R 2 insulation in external walls	3.5	58.5	28.3
C.69	3.5	45.9	76.7	Tinted glass 0.5 SHGC plus Holland blinds	3.5	39.1	58.3
C.70	3	58.7	50.9	R 1.5 Insulation in external walls	3.5	38.6	56.6
C.71	1.5	156.8	69.8	R 2 Insulation in roof	4	56.5	21.2
D.72	3	64.4	50.7	R 1.5 insulation in external walls	4	42.6	40.2
D.73	3	84.5	31.2	R 1.5 Insulation in all external walls	4	55.4	27.3
D.74	3.5	48.5	44.1	R 1.5 Insulation in all external walls	4	41.8	43.6
D.75	3	64.4	50.7	R 1.5 insulation in external walls	4	42.6	40.2
D.76	3	84.5	31.2	R 1.5 Insulation in all external walls	4	55.4	27.3
D.77	3.5	48.5	44.1	R 1.5 Insulation in all external walls	4	41.8	43.6
D.78	3	64.4	50.7	R 1.5 insulation in external walls	4	42.6	40.2
D.79	3	84.5	31.2	R 1.5 Insulation in all external walls	4	55.4	27.3
D.80	3.5	48.5	44.1	R 1.5 Insulation in all external walls	4	41.8	43.6
D.81	3	64.4	50.7	R 1.5 insulation in external walls	4	42.6	40.2
D.82	3	84.5	31.2	R 1.5 Insulation in all external walls	4	55.4	27.3
D.83	3.5	48.5	44.1	R 1.5 Insulation in all external walls	4	41.8	43.6
D.84	3	64.4	50.7	R 1.5 insulation in external walls	4	42.6	40.2
D.85	3	84.5	31.2	R 1.5 Insulation in all external walls	4	55.4	27.3
D.86	3.5	48.5	44.1	R 1.5 Insulation in all external walls	4	41.8	43.6
D.87	1.5	138.9	65.2	R 2 Insulation in roof	5	38.3	22.6
E.88	3	56.9	44.6		3	56.9	44.6
E.89	3.5	59.0	29.5		3.5	59	29.5
E.90	3.5	35.9	60.9	Holland Blinds	3.5	33.2	55.1
E.91	3	56.9	44.6				
E.92	3.5	59.0	29.5				
E.93	3.5	35.9	60.9	Holland Blinds	3.5	33.2	55.1
E.94	3	56.9	44.6				
E.95	2	100.8	62.5	R 1 Insulation in external walls plus, double glazing U=4.25 plus Holland Blinds	3	64.8	40.5
E.96	3	36.1	60.7	Holland Blinds	3.5	55	33.5
E.97	3	35.9	51.8				
E.98	3	56.9	44.6				

E.99	1	100.8	62.5	R 1 Insulation in external walls plus, double glazing U=4.25 plus Holland Blinds	3	64.8	40.5
E.100	1	36.1	60.7	Holland Blinds	3.5	55	33.5
E.101	1	35.9	51.8				
E.102	1	151.5	81.2	R 2 Insulation in roof, R 1 insulation in walls, Holland blinds	4	38.6	27.4
E.103	1	145.8	91.1	R 2 Insulation in roof, R 1 insulation in walls, Holland blinds	4	29.6	29.2
F.104	3.5	59.2	29.1	R 2.5 insulation in in external walls	4	51	27.1
F.105	3	60.9	63.4	R.2.5 insulation, tinted glass 0.5 SHGC plus Holland Blinds	3.5	50.9	50.3
F.106	2	115.0	45.4	R 2.5 Insulation in external walls plus Holland Blinds	3	65.5	33.1
F.107	2	97.0	63.2	R 2.5 Insulation in external walls plus double glazing U=4.25	3	64.4	49.6
F.108	3	56.8	51.5		3	56.8	51.5
F.109	3.5	59.2	29.1	R 2.5 insulation in in external walls	4	51	27.1
F.110	3	60.9	63.4	R.2.5 insulation, tinted glass 0.5 SHGC plus Holland Blinds	3.5	50.9	50.3
F.111	2.5	57.0	69.5	Tinted glass 0.5 SHGC plus double glazing U=4.25	3	50.7	53
F.112	2.5	84.5	54.4	Double glazing U=4.25	3	63.9	45.4
F.113	3	56.8	51.5				
F.114	3.5	59.2	29.1	R 2.5 insulation in in external walls	4	51	27.1
F.115	3	60.9	63.4	R.2.5 insulation, tinted glass 0.5 SHGC plus Holland Blinds	3.5	50.9	50.3
F.116	2.5	57.0	69.5	R 2.5 Insulation in external walls plus Holland Blinds	3	65.5	33.1
F.117	2.5	84.5	54.4	Double glazing U=4.25	3	63.9	45.4
F.118	3	56.8	51.5				
F.119	3.5	59.2	29.1	R 2.5 insulation in in external walls	4	51	27.1
F.120	3	60.9	63.4	R.2.5 insulation, tinted glass 0.5 SHGC plus Holland Blinds	3.5	50.9	50.3
F.121	2.5	57.0	69.5	R 2.5 Insulation in external walls plus Holland Blinds	3	65.5	33.1
F.122	2.5	84.5	54.4	Double glazing U=4.25	3	63.9	45.4
F.123	3	56.8	51.5				
F.124	1	150.5	101.6	R 2 Insulation in the roof plus Holland blinds	4.5	37.1	30.9
F.125	1	168.3	96.7	R 2 Insulation in the roof, R1.5 insulation in walls plus Holland blinds	3.5	45.6	33.9
G.126	2.5	101.0	39.2	R 2Insulation in external walls plus Holland Blinds	3.5	58	28.2
G.127	3	82.8	40.7	R 2 insulation in external walls plus Holland blinds	3.5	52.6	38.3
G.128	3	73.9	30.7	R 2 Insulation in external walls plus Holland blinds	4	53	30

G.129	3.5	64.9	38.0	R 2 Insulation in external walls, Tinted glass 0.5 SHGC plus Holland Blinds	4	46.5	36.1
G.130	3	83.0	33.1	R2 Insulation in external walls plus Holland Blinds	4	51.2	27
G.131	2.5	101.0	39.2	R 2Insulation in external walls plus Holland Blinds	3.5	58	28.2
G.132	3	82.8	40.7	R 2 insulation in external walls plus Holland blinds	3.5	52.6	38.3
G.133	3	73.9	30.7	R 2 Insulation in external walls plus Holland blinds	4	53	30
G.134	3.5	64.9	38.0	R 2 Insulation in external walls, Tinted glass 0.5 SHGC plus Holland Blinds	4	46.5	36.1
G.135	3	83.0	33.1	R2 Insulation in external walls plus Holland Blinds	4	51.2	27
G.136	2.5	101.0	39.2	R 2Insulation in external walls plus Holland Blinds	3.5	58	28.2
G.137	3	82.8	40.7	R 2 insulation in external walls plus Holland blinds	3.5	52.6	38.3
G.138	3	73.9	30.7	R 2 Insulation in external walls plus Holland blinds	4	53	30
G.139	3.5	64.9	38.0	R 2 Insulation in external walls, Tinted glass 0.5 SHGC plus Holland Blinds	4	46.5	36.1
G.140	3	83.0	33.1	R2 Insulation in external walls plus Holland Blinds	4	51.2	27
G.141	2.5	101.0	39.2	R 1 Insulation in external walls	3.5	62.8	29.5
G.142	3	82.8	40.7	R 2Insulation in external walls plus Holland Blinds	3.5	58	28.2
G.143	3	73.9	30.7	R 2 Insulation in external walls plus Holland blinds	4	53	30
G.144	3.5	64.9	38.0	R 2 Insulation in external walls, Tinted glass 0.5 SHGC plus Holland Blinds	4	46.5	36.1
G.145	3	83.0	33.1	R2 Insulation in external walls plus Holland Blinds	4	51.2	27
G.146	1	101.8	129.3	R 2 Insulation in roof, tinted glass 0.5 SHGC plus Holland blinds	4	20.3	58.6
G.147	1	136.3	141.9	R 2 Insulation in roof	4.5	19.2	54.1
G.148	0.5	139.4	158.6	R 2 Insulation in roof tinted glass 0.3 SHGC plus Holland Blinds	3	50.4	51.7

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3 CONCLUSION

The glazing requirement is single clear glazing, with U-value and SHGC values as specified in **Table 1** or with modifications as per **Table 2**. It is noted that the above glazing allowances are the minimum glazing requirements that should be considered to meet thermal comfort needs at this DA/planning stage of the development.

The U-value and SHGC value for the glazing and the R value for the insulation must be noted on drawings for DA submission.

Implementation of the modelling specifications noted in **Table 1** and **Table 2** will allow the ABSA and BASIX specifications to be achieved for residential buildings A, B, C, D, E, F & G.

4 CLOSURE

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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