



SYDNEY OLYMPIC PARK SITE 3 ESD REPORT

**On behalf of
Site 3 Development Company Pty Ltd**

**Prepared by
Ecospecifier Consulting
Jan 2009**

Introduction

This report summarises the ESD initiatives proposed for the development at Olympic Park Site 3, in particular focusing on the thermal comfort and BASIX-related issues. The report has been prepared by Ecospecifier Consulting on behalf of Site 3 Development Company.

Ecospecifier Consulting and Site 3 Development Company have both worked closely with the architects, Turner and Associates, to ensure very high levels of sustainability outcomes. In particular, since the original ESD assessment by Cundalls, a stronger emphasis has been placed on the passive efficiency of the building.

Indeed, the team has worked collaboratively to develop a design with excellent passive heating, cooling and ventilation, and the success of these initiatives is discussed in the report below. Part of the success of the design has also been brought about by the developer's willingness to adopt leading new ideas & construction materials.

Thermal Comfort Results

BERS Pro v4.1 was used to simulate the thermal comfort conditions for all 216 apartments. Overall, the development performed extremely well with an average star rating of 7.5 stars, an average heating load of around 15.8 MJ/m².year and an average cooling load of around 13.7 MJ/m².year. These results have been listed in full at the end of this report.

The area adjusted values above are in fact less than the 1/3 the average values permitted under BASIX (which are 51.0 MJ/m².year and 45.0 MJ/m².year for heating and cooling respectively). These superb results are a testament to the excellent passive heating, passive cooling and natural ventilation of the design.

Some of the thermally efficient materials and passive design techniques incorporated to achieve the results include:

- Thermally-improved aluminium frames for all windows
- Double-glazed Low-E, argon-filled glazing for all windows
- Tinted glazing for selected windows with high solar gain
- Pressure-balanced Hebel PowerPanel external walls (with good inherent insulation of the autoclaved aerated concrete)
- External wall insulation (R1.5+foil added)
- External ceiling/roof insulation (R3.0+foil added)
- Hebel, concrete and concrete block to provide internal thermal mass
- Sunhood and balconies to provide horizontal solar shading
- Louvres and privacy screens to provide vertical solar shading
- Dual aspect for many apartments to facilitate natural ventilation
- Openable windows in bedrooms and living areas to assist this natural ventilation

BASIX RESULTS

Overall the development also performed extremely well in both the water and energy calculations within BASIX. The Energy score was 31/20 and the Water score was 66/40.

In regard to Water, the following ESD initiatives have been proposed:

- RAMS recycled water supply to be used for irrigation, toilets, laundries and car wash
- Almost exclusive use of indigenous or “one-drop” plant species
- Top efficiency for showerheads – 3*
- Top efficiency for toilets – 4*
- Top efficiency for kitchen and bathroom taps – 6*
- Water-efficient dishwashers – 3* water rating

In regard to Energy, the following ESD initiatives have been proposed:

- Excellent thermal comfort results to reduce the reliance on heating and cooling
- Energy efficient air conditioning - 5 star individual AC units for units
- Energy efficient hot water – gas-boosted solar hot water system
- Insulated hot water ringmain and supply risers to reduce heat loss
- Building Management Systems (BMS) to ensure the efficient lighting and ventilation of common areas
- Active power factor correction (PFC)
- Efficient lights for common areas (fluorescents and compact fluorescents)
- Energy efficient lights for units (LEDs and compact fluorescents)
- Lighting efficiency measures (such as motion sensors for car park and common areas)
- Natural air supply to car park (with natural air supplied to over 2/3 the area)
- Energy efficient ventilation of car park (with CO monitors and variable speed fans)
- Energy efficient ventilation of common areas (including time clocks and BMS control)
- Internal clothes lines to all units
- Energy efficient dishwashers and clothes dryers to all units
- Gas cooktops for all units

CONCLUSION

Overall, the development has performed exceedingly well in all aspects of BASIX (water, energy and thermal comfort). The Energy score was 31/20 and the Water score was 66/40. Furthermore, the average heating and cooling loads (using BERS Pro v4.1) were less than 1/3 the maximum values permitted under BASIX, indicating the excellent passive heating and cooling of the design. These scores reflect the excellent ESD initiatives proposed, as well as the solid efforts of the design team to far exceed the minimum compliance conditions. These environmental initiatives will not just reduce water and energy consumption, but will also create enjoyable and healthy living environments for its future residents.

Table of BERS Pro Thermal Comfort Results



Unit	Bedrooms	Cond. Area (m2)	Heating (MJ/m2.yr)	Cooling (MJ/m2.yr)	Total (MJ/m2.yr)	Star Rating
A1.01	3	140.7	12.5	18.4	30.8	7.5
A1.02	1	62.8	14.0	3.0	17.0	8.5
A1.03	2	95.9	14.0	9.2	23.3	8.0
A1.04	1	57.6	26.1	8.7	34.8	7.0
A1.05	2	92.4	13.4	12.2	25.6	8.0
A1.06	1	56.5	53.9	17.6	71.5	4.5
A1.07	2	88.7	33.9	15.8	49.6	6.0
A2.01	2	109.7	17.3	15.7	32.9	7.0
A2.02	1	62.8	14.0	3.0	17.0	8.5
A2.03	2	95.9	15.1	10.5	25.6	8.0
A2.04	1	57.6	26.1	8.7	34.8	7.0
A2.05	2	84.7	16.5	9.8	26.2	7.5
A2.06	1	62.8	22.0	12.5	34.5	7.0
A2.07	1	55.4	13.9	12.2	26.1	8.0
A3.01	2	109.7	17.3	15.7	32.9	7.0
A3.02	1	62.8	14.0	3.0	17.0	8.5
A3.03	2	95.9	15.1	10.5	25.6	8.0
A3.04	1	57.6	26.1	8.7	34.8	7.0
A3.05	2	84.7	16.5	9.8	26.2	7.5
A3.06	1	62.8	22.0	12.5	34.5	7.0
A3.07	1	55.4	13.9	12.2	26.1	8.0
A4.01	2	109.7	17.3	15.7	32.9	7.0
A4.02	1	62.8	14.0	3.0	17.0	8.5
A4.03	2	95.9	14.0	9.2	23.3	8.0
A4.04	1	57.6	26.1	8.7	34.8	7.0
A4.05	2	84.7	16.5	9.8	26.2	7.5
A4.06	1	62.8	22.0	12.5	34.5	7.0
A4.07	1	55.4	13.9	12.2	26.1	8.0
A5.01	2	109.7	17.3	15.7	32.9	7.0
A5.02	1	62.8	14.0	3.0	17.0	8.5
A5.03	2	95.9	15.1	10.5	25.6	8.0
A5.04	1	57.6	26.1	8.7	34.8	7.0
A5.05	2	84.7	16.5	9.8	26.2	7.5
A5.06	1	62.8	22.0	12.5	34.5	7.0
A5.07	1	55.4	13.9	12.2	26.1	8.0
A6.01	2	109.7	17.3	15.7	32.9	7.0
A6.02	1	62.8	14.0	3.0	17.0	8.5
A6.03	2	95.9	15.1	10.5	25.6	8.0
A6.04	1	57.6	26.1	8.7	34.8	7.0
A6.05	2	84.7	16.5	9.8	26.2	7.5
A6.06	1	62.8	22.0	12.5	34.5	7.0
A6.07	1	55.4	13.9	12.2	26.1	8.0
A7.01	1	64.9	28.0	22.7	50.7	6.0
A7.02	2	82.3	14.2	3.6	17.8	8.5
A7.03	2	95.9	14.0	9.2	23.3	8.0
A7.04	1	57.6	26.1	8.7	34.8	7.0
A7.05	2	84.7	16.5	9.8	26.2	7.5
A7.06	2	88.7	16.4	16.9	33.3	7.0
A7.07	1	52.6	16.1	8.1	24.2	8.0
A8.01	1	64.9	28.0	22.7	50.7	6.0
A8.02	2	82.3	14.2	3.6	17.8	8.5
A8.03	2	95.9	15.1	10.5	25.6	8.0

Unit	Bedrooms	Cond. Area (m2)	Heating (MJ/m2.yr)	Cooling (MJ/m2.yr)	Total (MJ/m2.yr)	Star Rating
A8.04	1	57.6	26.1	8.7	34.8	7.0
A8.05	2	84.7	16.5	9.8	26.2	7.5
A8.06	2	88.7	16.4	16.9	33.3	7.0
A8.07	1	52.6	16.1	8.1	24.2	8.0
A9.01	1	64.9	28.0	22.7	50.7	6.0
A9.02	2	82.3	14.2	3.6	17.8	8.5
A9.03	2	95.9	15.1	10.5	25.6	8.0
A9.04	1	57.6	26.1	8.7	34.8	7.0
A9.05	2	84.7	16.5	9.8	26.2	7.5
A9.06	2	88.7	16.4	16.9	33.3	7.0
A9.07	1	52.6	16.1	8.1	24.2	8.0
A10.01	1	64.9	28.0	22.7	50.7	6.0
A10.02	2	82.3	14.2	3.6	17.8	8.5
A10.03	2	95.9	14.0	9.2	23.3	8.0
A10.04	1	57.6	26.1	8.7	34.8	7.0
A10.05	2	84.7	16.5	9.8	26.2	7.5
A10.06	2	88.7	16.4	16.9	33.3	7.0
A10.07	1	52.6	16.1	8.1	24.2	8.0
A11.01	1	64.9	28.0	22.7	50.7	6.0
A11.02	2	82.3	14.2	3.6	17.8	8.5
A11.03	2	95.9	15.1	10.5	25.6	8.0
A11.04	1	57.6	26.1	8.7	34.8	7.0
A11.05	2	84.7	16.5	9.8	26.2	7.5
A11.06	2	88.7	16.4	16.9	33.3	7.0
A11.07	1	52.6	16.1	8.1	24.2	8.0
A12.01	1	64.9	28.0	22.7	50.7	6.0
A12.02	2	82.3	14.2	3.6	17.8	8.5
A12.03	2	95.9	15.1	10.5	25.6	8.0
A12.04	1	57.6	26.1	8.7	34.8	7.0
A12.05	2	84.7	16.5	9.8	26.2	7.5
A12.06	2	88.7	16.4	16.9	33.3	7.0
A12.07	1	52.6	16.1	8.1	24.2	8.0
A13.01	1	64.9	28.0	22.7	50.7	6.0
A13.02	2	82.3	14.2	3.6	17.8	8.5
A13.03	2	95.9	14.0	9.2	23.3	8.0
A13.04	1	57.6	26.1	8.7	34.8	7.0
A13.05	2	84.7	16.5	9.8	26.2	7.5
A13.06	2	88.7	16.4	16.9	33.3	7.0
A13.07	1	52.6	16.1	8.1	24.2	8.0
A14.01	3	121.3	13.6	22.5	36.2	7.0
A14.02	2	82.3	14.2	3.6	17.8	8.5
A14.03	2	95.9	15.1	10.5	25.6	8.0
A14.04	1	57.6	26.1	8.7	34.8	7.0
A14.05	2	84.7	16.5	9.8	26.2	7.5
A14.06	2	88.7	16.4	16.9	33.3	7.0
A15.01	3	121.3	13.6	22.5	36.2	7.0
A15.02	2	82.3	14.2	3.6	17.8	8.5
A15.03	2	95.9	15.1	10.5	25.6	8.0
A15.04	1	57.6	27.6	9.3	36.9	7.0
A15.05	2	84.7	28.0	10.5	38.5	6.5
A15.06	2	88.7	16.4	16.9	33.3	7.0
A16.01	3	121.3	13.6	22.5	36.2	7.0
A16.02	2	82.3	14.2	3.6	17.8	8.5
A16.03	2	95.9	15.5	9.5	25.0	8.0
A16.04	2	90.7	27.6	16.4	44.0	6.5

Unit	Bedrooms	Cond. Area (m2)	Heating (MJ/m2.yr)	Cooling (MJ/m2.yr)	Total (MJ/m2.yr)	Star Rating
A16.05	2	93.4	16.0	16.7	32.7	7.0
A17.01	3	121.3	13.6	22.5	36.2	7.0
A17.02	2	82.3	14.2	3.6	17.8	8.5
A17.03	2	95.9	16.6	11.0	27.6	7.5
A17.04	2	90.7	22.1	22.3	71.0	6.5
A17.05	2	93.4	15.9	27.8	43.7	6.5
A18.01	3	121.3	13.6	22.5	36.2	7.0
A18.02	2	82.3	14.2	3.6	17.8	8.5
A18.03	2	95.9	16.6	11.0	27.6	7.5
A18.04	2	90.7	22.1	22.3	71.0	6.5
A18.05	2	93.4	15.9	27.8	43.7	6.5
A19.01	3	121.3	13.6	22.5	36.2	7.0
A19.02	2	82.3	14.2	3.6	17.8	8.5
A19.03	2	95.9	16.6	11.0	27.6	7.5
A19.04	2	90.7	22.1	22.3	71.0	6.5
A19.05	2	93.4	15.9	27.8	43.7	6.5
A20.01	3	121.3	13.6	22.5	36.2	7.0
A20.02	2	82.3	14.2	3.6	17.8	8.5
A20.03	2	95.9	26.1	12.4	38.6	7.0
A20.04	2	90.7	22.1	22.3	71.0	6.5
A20.05	2	93.4	15.9	27.8	43.7	6.5
A21.01	3	121.3	13.6	22.5	36.2	7.0
A21.02	2	102.5	19.4	13.7	33.1	7.0
A21.03	3	125.2	27.6	25.5	53.1	5.5
A21.04	2	93.4	15.9	27.8	43.7	6.5
A22.01	3	121.3	13.6	22.5	36.2	7.0
A22.02	2	102.5	19.4	13.7	33.1	7.0
A22.03	3	125.2	27.6	25.5	53.1	5.5
A22.04	2	93.4	15.9	27.8	43.7	6.5
A23.01	3	121.3	24.5	26.0	50.4	6.0
A23.02	2	102.5	32.6	17.3	49.8	6.0
A23.03	3	125.2	40.5	29.5	70.0	4.5
A23.04	2	93.4	18.9	54.0	72.9	4.5
B1.01	1	68.0	32.4	13.4	45.8	6.0
B1.02	1	49.8	15.2	15.9	31.2	7.5
B1.03	1	56.2	30.1	18.6	48.7	6.0
B2.01	2	88.8	12.1	8.2	20.3	8.0
B2.02	1	66.9	12.8	16.0	28.8	7.5
B2.03	2	119.1	28.8	25.2	53.9	5.5
B2.04	1	68.8	3.2	15.4	18.6	8.5
B2.05	1	49.8	0.6	13.2	13.8	9.0
B2.06	1	56.2	3.2	15.4	18.6	8.5
B3.01	2	88.8	12.1	8.2	20.3	8.0
B3.02	1	66.9	8.1	9.6	17.7	8.5
B3.03	2	119.1	15.2	22.8	38.0	7.0
B3.04	1	68.8	6.5	11.9	18.4	8.5
B3.05	1	49.8	0.6	13.2	13.8	9.0
B3.06	1	56.2	3.2	15.4	18.6	8.5
B4.01	2	88.8	12.1	8.2	20.3	8.0
B4.02	1	66.9	8.1	9.6	17.7	8.5
B4.03	2	119.1	15.2	22.8	38.0	7.0
B4.04	1	68.8	6.5	11.9	18.4	8.5
B4.05	1	49.8	0.6	13.2	13.8	9.0
B4.06	1	56.2	3.2	15.4	18.6	8.5
B5.01	2	88.8	12.1	8.2	20.3	8.0

Unit	Bedrooms	Cond. Area (m2)	Heating (MJ/m2.yr)	Cooling (MJ/m2.yr)	Total (MJ/m2.yr)	Star Rating
B5.02	1	66.9	8.1	9.6	17.7	8.5
B5.03	2	119.1	15.2	22.8	38.0	7.0
B5.04	1	68.8	6.5	11.9	18.4	8.5
B5.05	1	49.8	0.6	13.2	13.8	9.0
B5.06	1	56.2	3.2	15.4	18.6	8.5
B6.01	2	88.8	12.1	8.2	20.3	8.0
B6.02	1	66.9	8.1	9.6	17.7	8.5
B6.03	2	119.1	15.2	22.8	38.0	7.0
B6.04	1	68.8	6.5	11.9	18.4	8.5
B6.05	1	49.8	0.6	13.2	13.8	9.0
B6.06	1	56.2	3.2	15.4	18.6	8.5
B7.01	2	88.8	12.1	8.2	20.3	8.0
B7.02	1	66.9	8.1	9.6	17.7	8.5
B7.03	2	119.1	15.2	22.8	38.0	7.0
B7.04	2	96.8	5.9	11.6	17.5	8.5
B7.05	2	86.8	3.9	17.1	21.0	8.0
B8.01	2	88.8	12.1	8.2	20.3	8.0
B8.02	1	66.9	8.1	9.6	17.7	8.5
B8.03	2	119.1	15.2	22.8	38.0	7.0
B8.04	2	96.8	5.9	11.6	17.5	8.5
B8.05	2	86.8	3.9	17.1	21.0	8.0
B9.01	2	88.8	12.1	8.2	20.3	8.0
B9.02	1	66.9	8.1	9.6	17.7	8.5
B9.03	2	119.1	15.2	22.8	38.0	7.0
B9.04	2	96.8	5.9	11.6	17.5	8.5
B9.05	2	86.8	3.9	17.1	21.0	8.0
B10.01	2	88.8	12.1	8.2	20.3	8.0
B10.02	1	66.9	8.1	9.6	17.7	8.5
B10.03	2	119.1	15.2	22.8	38.0	7.0
B10.04	2	96.8	5.9	11.6	17.5	8.5
B10.05	2	86.8	3.9	17.1	21.0	8.0
B11.01	2	88.8	12.1	8.2	20.3	8.0
B11.02	1	66.9	8.1	9.6	17.7	8.5
B11.03	2	119.1	15.2	22.8	38.0	7.0
B11.04	2	96.8	5.9	11.6	17.5	8.5
B11.05	2	86.8	3.9	17.1	21.0	8.0
B12.01	2	88.8	12.1	8.2	20.3	8.0
B12.02	1	66.9	8.1	9.6	17.7	8.5
B12.03	2	119.1	15.2	22.8	38.0	7.0
B12.04	2	96.8	5.9	11.6	17.5	8.5
B12.05	2	86.8	3.9	17.1	21.0	8.0
B13.01	2	88.8	12.1	8.2	20.3	8.0
B13.02	1	66.9	8.1	9.6	17.7	8.5
B13.03	2	119.1	15.2	22.8	38.0	7.0
B13.04	2	96.8	25.5	14.2	39.6	6.5
B13.05	2	86.8	6.2	18.0	24.2	8.0
B14.01	2	88.8	12.1	8.2	20.3	8.0
B14.02	1	66.9	8.1	9.6	17.7	8.5
B14.03	2	119.1	15.2	22.8	38.0	7.0
B14.04	2	100.6	6.5	18.0	24.4	8.0
B15.01	2	88.8	22.9	8.9	31.8	7.5
B15.02	1	66.9	18.4	11.9	30.3	7.5
B15.03	2	119.1	25.6	27.0	52.6	5.5
B15.04	2	100.6	8.7	27.9	36.5	7.0
AVERAGE		83.9	15.8	13.7	29.5	7.5