

EXPERT OPINION  
**SEPP 65 AMENITY COMPLIANCE**  
**SOLAR ACCESS + CROSS VENTILATION**



**SHOP TOP HOUSING DEVELOPMENT**  
**21 Whistler Street Manly**  
23 August 2018

**1.0 PRELIMINARIES/SUMMARY**

1.1 I provide this **report** as an expert opinion, relating to **solar access** and **cross ventilation** compliance for the proposed **shop top housing development** comprising 8 units at **21 Whistler Street Manly**.

1.2 My qualifications and experience are included at *APPENDIX 3: CREDENTIALS*.

1.3 The documentation on which I rely for this opinion is set out in *2.0 Documents*.

**1.4 Solar access.**

**7 units out of the total 8 (87.5%) receive a minimum 2 hours of sun to Living area glazing and POS on June 21.** The ADG *Design criterion* nominates as a minimum 70%.

No unit receives 'no sun' as defined by the ADG *Design criterion*.

***The ADG performance objectives and Design criteria for solar access are satisfied.***

**1.5 Cross ventilation.**

**8 of the 8 (100%) apartments will be simply cross ventilated.** The *Design Criteria* of the Apartment Design Guide are fully satisfied.

**STEVE KING**

CONSULTANT

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## 2.0 DOCUMENTS

2.1 I base my report on:

- Preliminary DA drawings by Wolski Coppin Architects supplied to me on 16 August 2018:
  - SITE ANALYSIS
  - DA01 BASEMENT
  - DA02 GROUND
  - DA03 LEVEL 1
  - DA04 LEVEL 2
  - DA05 LEVEL 3
  - DA06 LEVEL 4
  - DA07 ROOF
  - DA08 SECTION AA
  - DA09 SECTION BB
  - DA10 EAST ELEVATION
  - DA11 NORTH ELEVATION
  - DA12 SOUTH ELEVATION
  - DA13 WEST ELEVATION
  - DA14 STREET ELEVATIONS
  - DA15 EAST ELEVATION
  - DA16 STREET VIEW
  - C01 GEFA CALCULATION
  - C02 ADAPTABLE
  - C03 SHADOW DIAGRAMS
- 3D digital model in .DWG format prepared by the architects.

## 3.0 SITE



Figure 1: Aerial view of site

The site is a regular rectangle shape illustrated in Figure 1, with Whistler Street to the east. The north, west and south boundaries are zero lot line setbacks.

Given the preferred location of the vertical circulation core at the rear of the property on the west elevation, the development is reliant on Whistler Street for access to direct sun for the living areas. The Whistler Street boundary is 'biased' to the south, and lines up exactly with the 11am solar azimuth direction on June 21. I recognise the architect's strategy of frameless bay windows to Whistler Street, with a north facing component to assure that direct sun is available to some glazing until 11am.

## 4.0 SOLAR ACCESS ANALYSIS METHODOLOGY

I employ my usual solar access analysis methodology.

### 4.1 3D digital model

4.1.1 My review and analysis are undertaken in *Trimble SketchUp* software. The 3D digital model is exported from the CAD file prepared by the architects. By use of the 3D digital model, quantification of solar access takes account of all self-shading within the subject site, as well as relevant external overshadowing.

4.1.2 I independently geolocated the 3D digital model and checked the direction of true north by online reference to cadastral grid north. I have spot checked a limited number of relevant heights and dimensions against the architectural drawings, and am satisfied that the model is sufficiently accurate for the purpose of solar access assessment.

4.1.3 I first examine the design by use of 'views from the sun'. The projection referred to as a '*View from the Sun*' shows all sunlit surfaces at a given time and date. It therefore allows a very precise count of sunlight hours on any glazing or horizontal surface, with little or no requirement for secondary calculations or interpolation. Figure 2 illustrates the technique. *Note that a 'view from the sun' by definition does not show any shadows.*

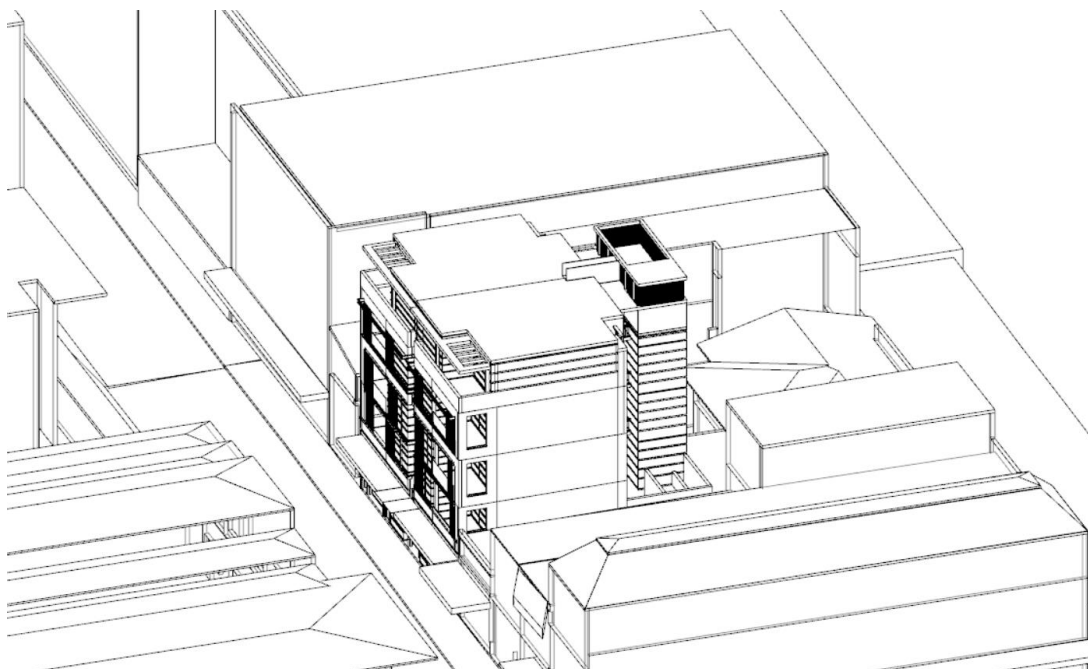


Figure 2: Geolocated detailed model in SketchUp. View from the sun at 10am  
*Note that the model incorporates relevant known and potential surrounding development.*

I include at Appendix B copies of half-hourly views from the sun for June 21.

### 4.2 Characterisation of solar access compliance

For the purpose of calculating the compliance with the control, I have first examined sun patches on the living room glazing of each apartment. I characterise as complying when sun access is over two hours total of partially or fully sunlit glazing between 9am and 3pm mid-winter.

4.2.1 For the determination of what is 'effective sunlight' for characterisation of compliance, for both glazing and private open space, I refer specifically to the application of the relevant *L+EC Planning Principle (The Benevolent Society v Waverley Council [2010] NSWLEC 1082)*.

I generally ignore very large angles of incidence to the glazing surface, and small areas of sunlit glazing. In this instance, I record that for the last 10 minutes before 11 AM that condition is not strictly met. However the modelling of the building and its context is sufficient to demonstrate that for at least a corresponding period before 9 AM, more effective direct sun is available to the living room glazing and private open space. For the purposes of this analysis, I therefore 'count' such direct sun from 9 AM to 11 AM.

## 5.0 SOLAR ACCESS TO APARTMENTS

### 5.1 Relevant solar access standards

#### 5.1.1 Apartment Design Guide

The Apartment Design Guide gives the following quantified recommendations:

<i>Design criteria</i>	
1.	Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas
2.	In all other areas, living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 3 hours direct sunlight between 9 am and 3 pm at mid winter
3.	A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid winter

#### 5.1.2 Local controls

I note that **Solar access (6.1) Design criteria** in the ADG are *discretionary controls* which, by virtue of Cl. 6A of SEPP65, **take precedence over these controls contained in Councils' DCPs**.

*In quantifying the compliance for solar access for this application, I rely on satisfying the ADG as also satisfying the DCP.*

### 5.2 Achieved solar access

The detailed compliance table in Appendix A records direct sun in a graphic format on the same half hourly basis as the views from the sun in Appendix B.

Table 1 summarises the projected solar access compliance of the development overall.

Total number of dwellings	8	
Units with over two hours of sun on June 21 to Living and POS 9am – 3pm	7	87.5%
Units with no sun 9am to 3pm	0	

**Table 1: Summary of solar access for units**

7 units out of the total 8 (87.5%) receive a minimum 2 hours of sun to Living area glazing and POS on June 21. The ADG *Design criterion* nominates as a minimum 70%.

No unit receives 'no sun' as defined by the ADG *Design criterion*.

## 6.0 NATURAL VENTILATION

### 6.1 Performance Objectives

The Apartment Design Guide gives the following *Design criteria*:

1.	At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed
2.	Overall depth of a cross-over or cross-through apartment does not exceed 18m, measured glass line to glass line

## **6.2 Cross ventilation**

### **6.2.1 Simple cross ventilation**

In Appendix A, I record the cross ventilation status of each apartment. I characterise as cross ventilated for amenity all corner and 'through' apartments with openings in two principal facades.

## **6.3 Achieved natural ventilation compliance.**

All of the 8 apartments are cross ventilated. Therefore, compliance with the ADG is fully satisfied.

## **7.0 CONCLUSIONS**

I carried out my own independent analysis and quantification of the predicted solar access and cross-ventilation achieved.

### **8.1 Solar access.**

7 units out of the total 8 (87.5%) receive a minimum 2 hours of sun to Living area glazing and POS on June 21. The ADG *Design criterion* nominates as a minimum 70%. I note that if I pay regard to sun available before 9am, the remaining unit also receives a minimum 2 hours of direct sun to glazing on June 21.

No unit receives 'no sun' as defined by the ADG Design criterion.

***The ADG performance objectives and Design criteria for solar access are satisfied.***

### **8.2 Cross ventilation**

All eight (100%) apartments will be simply cross ventilated. The *Design Criteria* of the Apartment Design Guide are fully satisfied.

***The proposed development fully complies with the relevant control for natural ventilation.***

Signed,



.....  
Steve King



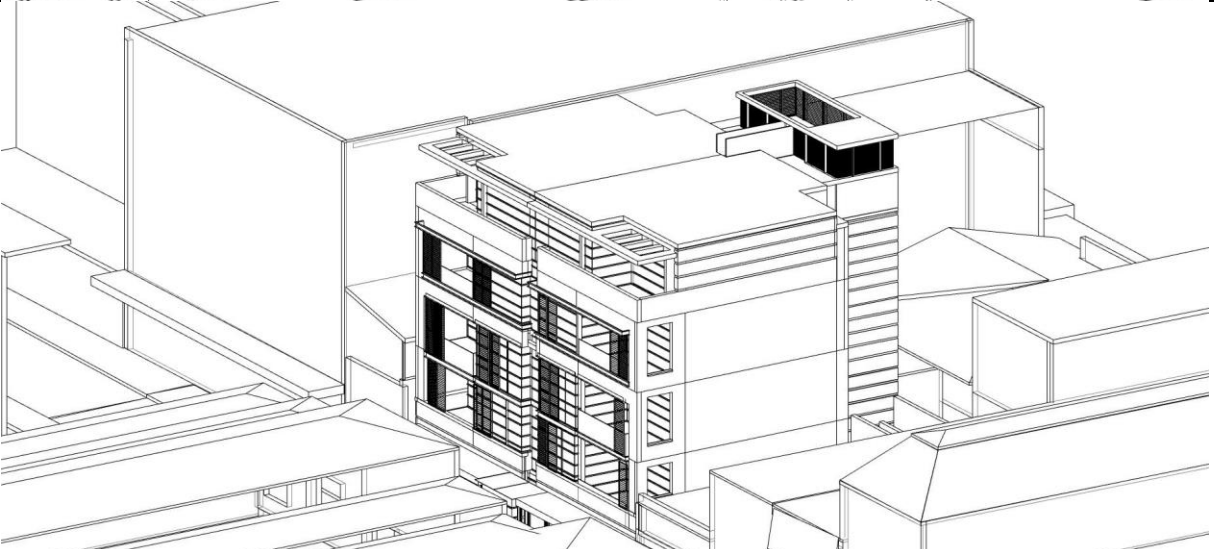
## APPENDIX A

The table below shows the detailed solar access and cross ventilation compliance status of each unit.

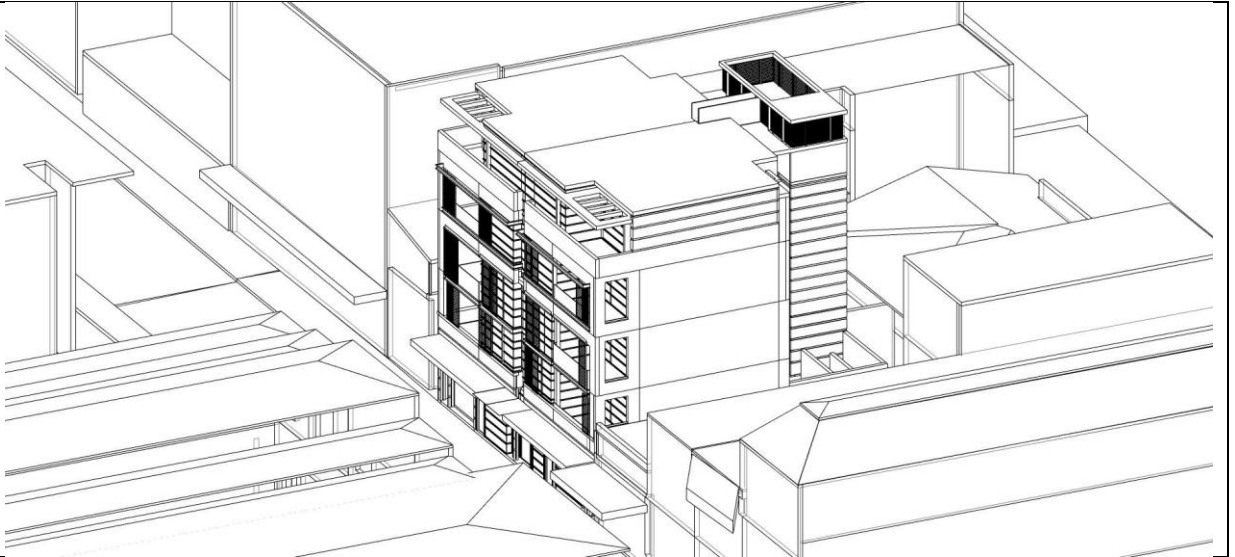
		Solar access																Solar compliance								
Level	UNIT	8	830	9	930	10	1030	11	1130	12	1230	13	1330	14	1430	15	1530	16	>3 hrs 9-3	>2 hrs 9-3 (>3hrs 8-4)	>2 hrs 9-3	>2hrs 8-4	No sun	POS 9-3	POS 8-4	Cross vent
LEVEL 1	U.101	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0			YES			YES		YES
	U.102	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		YES				YES		YES
LEVEL 2	U.201	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		YES				YES		YES
	U.202	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		YES				YES		YES
LEVEL 3	U.301	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		YES				YES		YES
	U.302	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0		YES				YES		YES
LEVEL 4	U.401	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0				YES			YES	YES
	U.402	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	YES					YES		YES
8																			1	5	1	1	0	7	1	8
																			12.5%	62.5%	12.5%	12.5%	0.0%	87.5%	12.5%	100.0%
																			75.0%	87.5%	100.0%	100.0%				

## APPENDIX B

The table below shows the views from the sun on a half-hourly basis on June 21.

8.00	
8.30	
9.00	

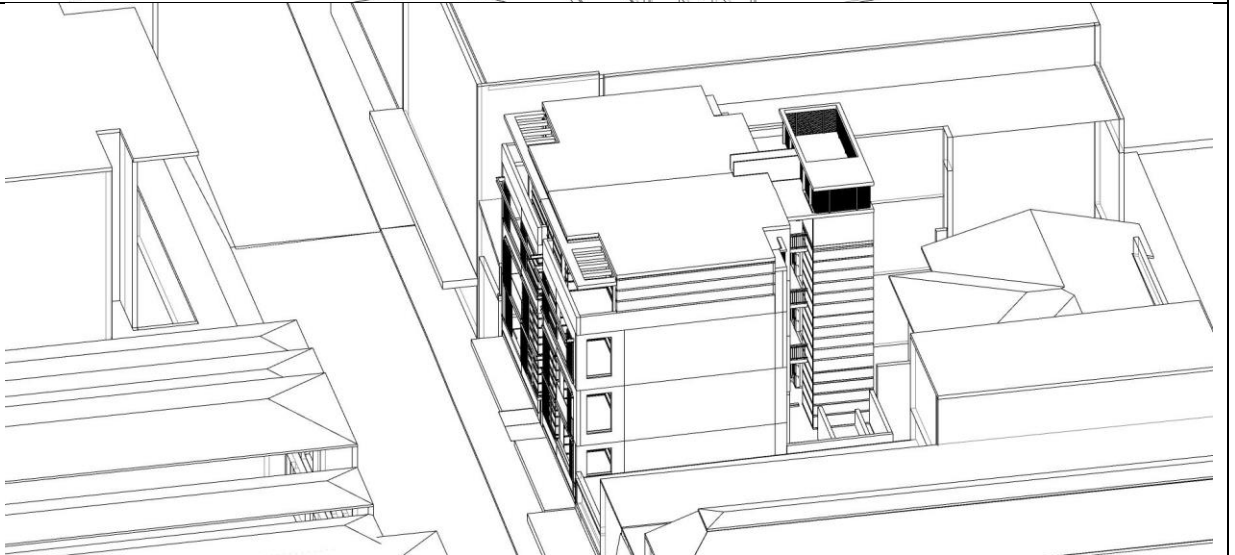
9.30



10.00

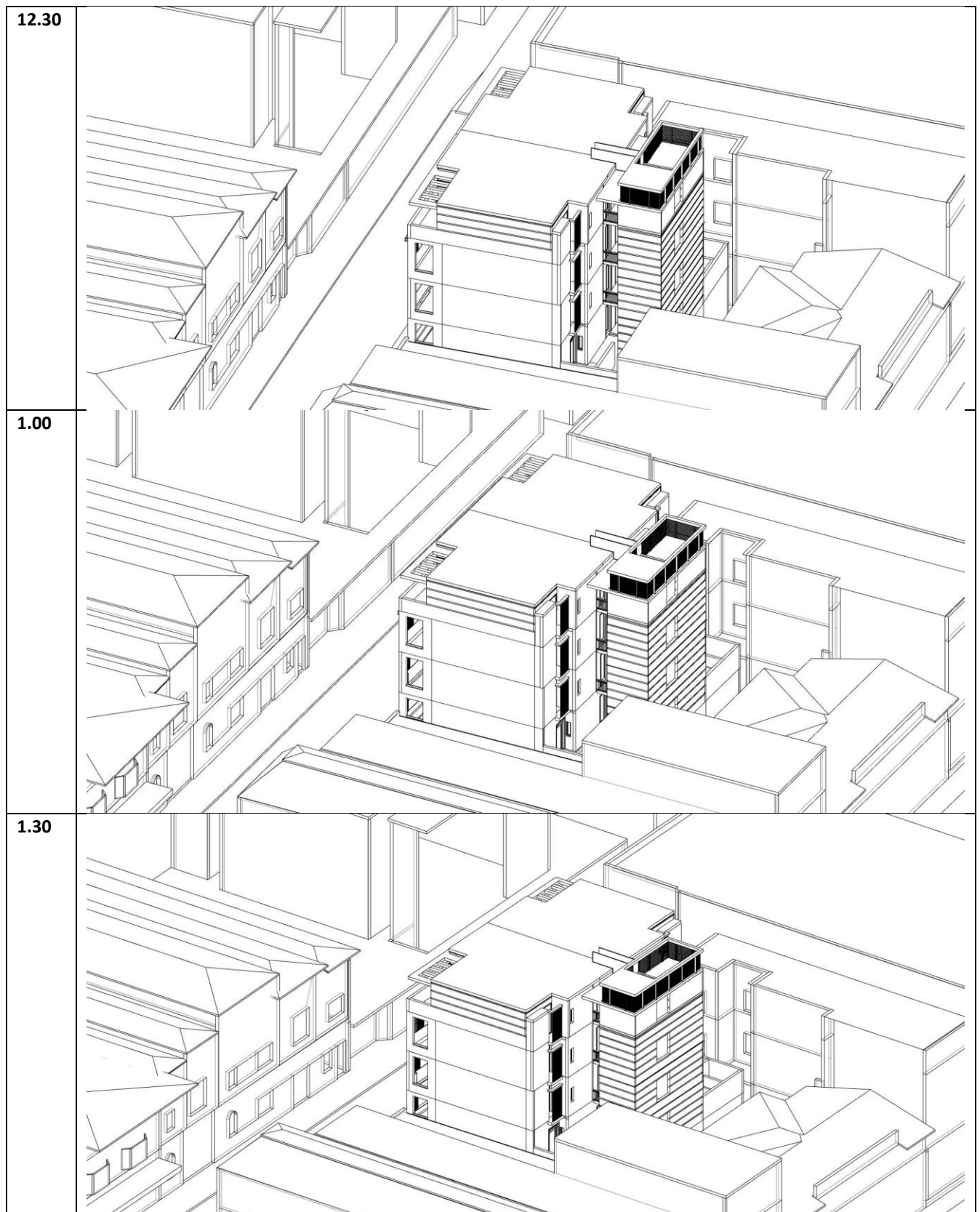


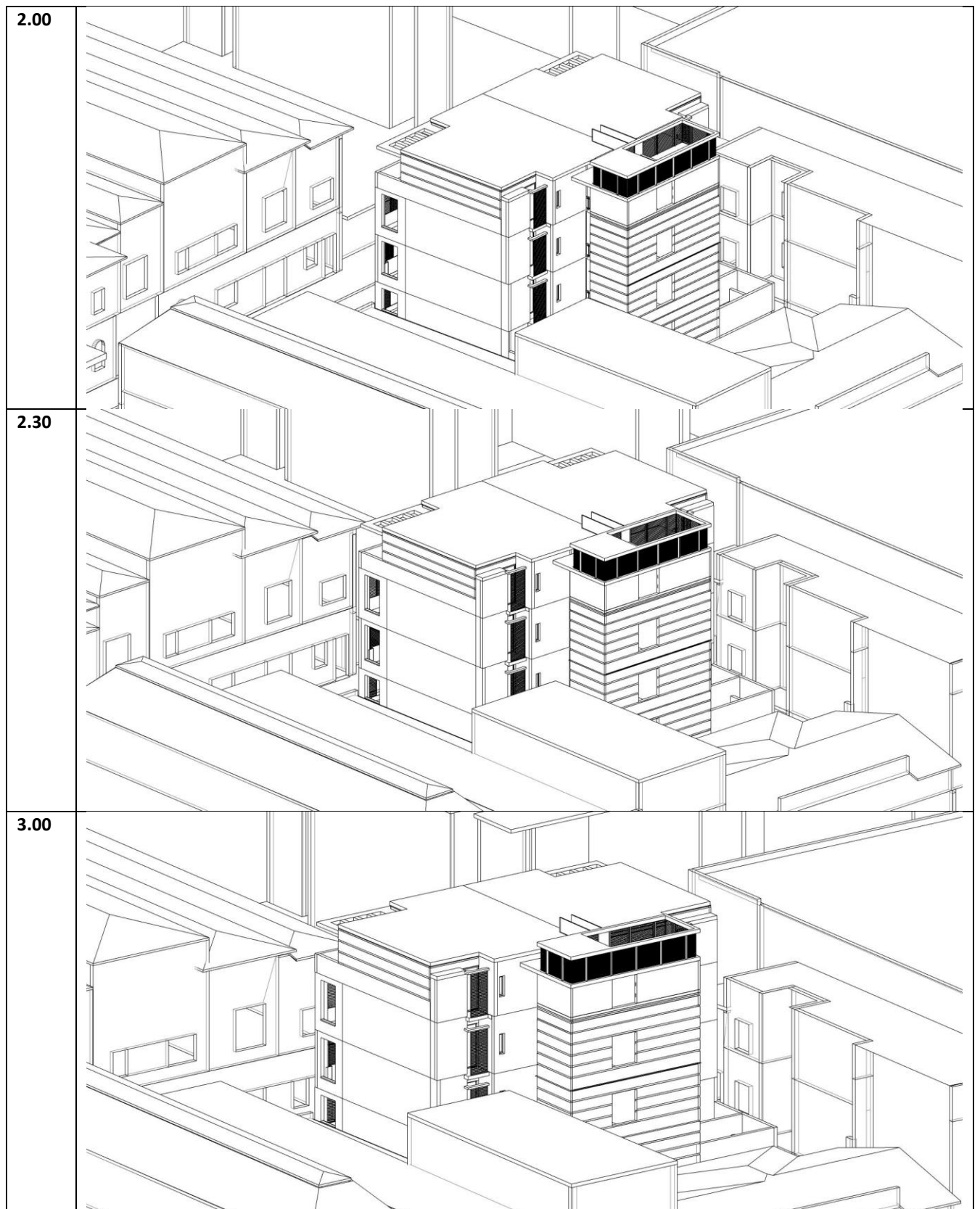
10.30











3.30



4.00



## APPENDIX C: CREDENTIALS

I taught architectural design, thermal comfort and building services at the Universities of Sydney, Canberra and New South Wales since 1971. From 1992, I was a Research Project Leader in SOLARCH, the National Solar Architecture Research Unit at the University of NSW, and until its disestablishment in November 2006, I was the Associate Director, Centre for Sustainable Built Environments (SOLARCH), UNSW.

My research and consultancy includes work in solar access, energy simulation and assessment for houses and multi-dwelling developments, building assessments under the NSW SEDA Energy Smart Buildings program, appropriate design and alternative technologies for museums and other cultural institutions, and asthma and domestic building design. I am the principal author of *SITE PLANNING IN AUSTRALIA: Strategies for energy efficient residential planning*, funded by the then Department of Primary Industry and Energy, and published by AGPS, and of the RAlA Environment Design Guides on the same topic.

SOLARCH/UNISEARCH were the contractors to SEDA NSW for the setting up and administration of the House Energy Rating Management Body (HMB), which accredits assessors under the Nationwide House Energy Rating Scheme (NatHERS), NSW. I was the technical supervisor of the HMB, with a broad overview of the dwelling thermal performance assessments carried out in NSW over five years. I have been a member of the NSW BRAC Energy Subcommittee, and also a member of the AGO Technical Advisory Committee on the implementation of AccuRate, the new mandated software tool under NatHERS. I undertook the Expert Review for the NSW Department of Planning, of the comparison of NatHERS and DIY methods of compliance for Thermal Comfort under BASIX, and was subsequently a member of a three person expert panel advising on the implementation of AccuRate in BASIX.

Through UNISEARCH, NEERG Seminars and Linarch Design, I conduct training in solar access and overshadowing assessment for Local Councils. I have delivered professional development courses on topics relating to energy efficient design both in Australia and internationally, including the key papers in the general area of assessment of ventilation and solar access performance and compliance for NEERG Seminars, cited by Commissioners of the LEC. Senior Commissioner Moore cited my assistance in reframing of the Planning Principle related to solar access (formerly known as the Parsonage Principle) in *The Benevolent Society v Waverley Council [2010] NSWLEC 1082*.

I practiced as a Registered Architect from 1971-2014, and now maintain a specialist consultancy practice advising on passive environmental performance and sustainability in buildings. I regularly assist the Land and Environment Court as an expert witness in related matters.