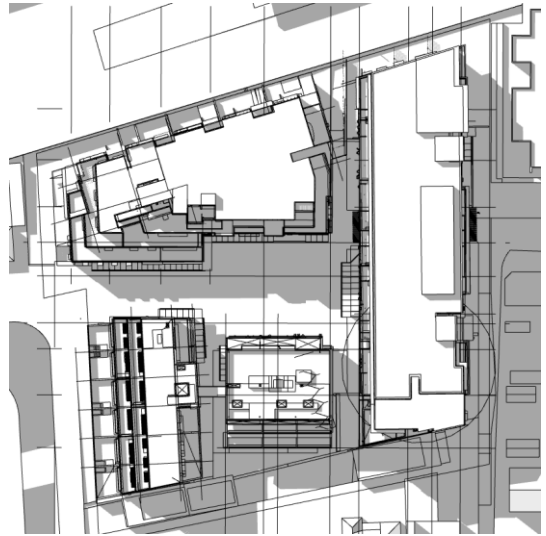


SUMMARY EXPERT OPINION

AMENITY COMPLIANCE
OVERSHADOWING, SOLAR ACCESS AND CROSS VENTILATION



s96 Application MIXED USE DEVELOPMENT 11 Mashman Avenue Kingsgrove

13 November 2012

Signed,

A handwritten signature in black ink, appearing to read "Steve King". The signature is fluid and cursive, with a large, stylized "S" and "K".

STEVE KING

CONSULTANT ARCHITECT

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PHONE 0414385485

1.0 PRELIMINARIES AND SUMMARY

1.1 I provide this summary report as an expert opinion, relating to **overshadowing, solar access and natural ventilation** compliance with the relevant local controls and with the Residential Flat Design Code as it gives effect to the Amenity provisions of SEPP65, in relation to the proposed s.96 application to modify Building C on the above site with an additional floor of apartments.

I address myself specifically to relevant comments of the St George Design Review Panel as recorded in the report of the Meeting held on Thursday, 1 November 2012.

1.2 My qualifications and experience are included at 2.0 *Credentials*.

1.3 **Overshadowing.** Because of the orientation of Building C, the additional overshadowing due to the proposed amendments is negligible on the public space within the development, and so minor on adjacent sites that it appears to cause no compliance issues. See 4.0 *OVERSHADOWING IMPACTS*.

1.4 **Solar access.** The additional floor of apartments proposed for Building C makes no difference in the solar access projected for any of the already approved apartments. However, for all intents and purposes, the additional apartments proposed actually increase the proportion of apartments in the development with complying solar access. The comparison is summarised under 5.0 *SOLAR ACCESS*.

1.5 **Natural ventilation.** The proposed additional apartments are well located to achieve natural ventilation amenity compliance, and do not adversely affect the overall compliance level of the development as a whole. The Panel's adverse comment appears to be based on a more restrictive definition of compliance than is usual to be applied by convention.

2.0 CREDENTIALS

I have been teaching 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. Until its disestablishment in December 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. I am the principal author of *SITE PLANNING IN AUSTRALIA: Strategies for energy efficient residential planning*, published by AGPS, and of the BDP Environment Design Guides on the same topic. Through NEERG Seminars, 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.

I teach the wind and ventilation components of environmental control in the undergraduate course in architecture at UNSW, and am the author of internationally referenced, web accessed coursework materials on the subject.

Of particular relevance, I have delivered the key papers in the general area of assessment of *ventilation and solar access performance and compliance*, including *Solar Access and Ventilation: Reflections on Parsonage* at the NEERG Seminar on 27 July 2005, cited by Commissioner Moore in the LEC the following day. Most Recently, 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*. See <http://www.lawlink.nsw.gov.au/lecjudgments/2010nswlec.nsf/19eb930e64c0733bca257363001d0a87/34316f1bf070268eca257703000db6e0?OpenDocument>

I am a Registered Architect and maintain a specialist consultancy practice in Sydney and Canberra. I regularly assist the Land and Environment Court as an expert witness in related matters.

3.0 DOCUMENTS AND INFORMATION

3.1 I base my report on:

- Architectural drawings of the current approved design Issue for Construction, by Kann Finch Group, being
 - 6126-020 dated 02/07/12;
 - 6126-106, 6126-107 through 6126-111, dated 22/10/12;
- Architectural drawings of the proposed s.96 design, by Kann Finch Group, being

- 6126-S96-011B and 012B dated 12/11/12;
- 6126-S96-1-SK02, SK03, SK04 and SK09 dated 14/10/12
- 3D Digital model in Google SketchUp software prepared by the architects and independently checked and analysed by me.

3.2 I have visited the site and viewed it from the surrounding streets.

4.0 OVERSHADOWING IMPACTS

4.1 The relevant comments of the Panel are:

The additional height will have adverse impact in relation to overshadowing and visual impact on the public open space, Block B and properties to the south and south east.
Apart from mid winter overshadowing in the plaza, this proposal will increase overshadowing at other times of the year.

4.2 The current s.96 application is for an additional storey to be added at Level 6 to Building C, being the slab block on the eastern boundary of the subject site. The comments of the Panel may be interpreted by reference to Figure 1, which shows the relationship of the proposed amended building to its immediate context.

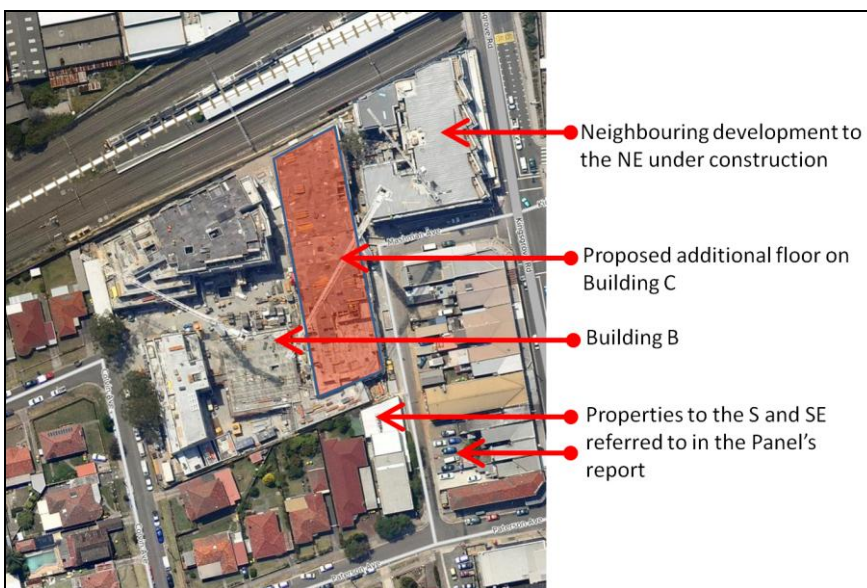


Figure 1: Proposed additional storey to Building C

4.3 **Public open space.** I have taken from the 3D digital model a comparison of overshadowing impacts between the proposed s96 design and the current approved design. Table 1 in Appendix A illustrates the plan shadows at 9am, 12 noon and 3pm at both June 21 (winter) and at the equinoxes.



Figure 2: Comparison of winter overshadowing of plaza June 21
See Table 1 Appendix A for other comparisons at June 21 and September 21

With respect to overshadowing of the approved public open space, there is effectively no additional overshadowing in winter. This is partly because the shadow pattern on the open space in the middle of the day is dominated by the shadow of Building D to the north (See Figure 2), and partly because the morning shadow of Building C is already so long that the additional floor will not cause any additional overshadowing on the plaza.

As the days lengthen towards the September Equinox, a barely perceptible difference in the area of shadow can be seen in the morning at 9am, reducing to negligible by mid-day, and not relevant during the afternoon.

4.4 Building B

In Figure 3 I show the additional overshadowing impact on Building B of the extra storey proposed for Building C. Because of the relative orientations of the two buildings, the impact is only in the early morning. As can be seen in the illustration, the apartments affected by some shadow at 9am already receive sun before 10am (and therefore for the rest of the day), and the entire façade is completely unaffected by some time before 12 noon.



Figure 3: Overshadowing impact on Building B

In brief, the overshadowing impact on Building B is certainly not a compliance issue, and could be described as negligible.

4.5 Properties to the south and south-east

Reference to Table 1 in Appendix A shows minor additional overshadowing of the rear yards of the said properties:

- At mid-winter there is no material difference to the shadow on the ground for 4 Paterson Ave;
- Any impact on the rear of the properties fronting Kingsgrove Rd appears to affect only paved car parking areas. See Figure 4.



Figure 4: Properties to the south and south-east of Building C

4.6 Property to the east

Under the separate head of 'Context' the panel also states:

The approved scheme on the adjoining property on the east – currently under construction – will be adversely impacted by this additional height.

The winter impact of an additional storey on Building C is effectively confined to the portion of the courtyard and western façades, at most over the height of one floor, at the location circled in Figure 5. Such additional impact is also likely to be for a very short duration, as the already approved relationship between the buildings defines the afternoon overshadowing (See the section in Figure 5). I have no information relating to the internal planning of the building under construction. But I think it can be safely inferred that this is likely to be a single apartment.

There is some summer impact on the west façade of the courtyard, but this appears to be largely the wall of a lift core.

There is, technically, a minor impact on *daylight* (as distinct from solar access), but it is likely to be negligible compared to the effect of voluntary use of window treatments to control privacy by residents of both buildings.

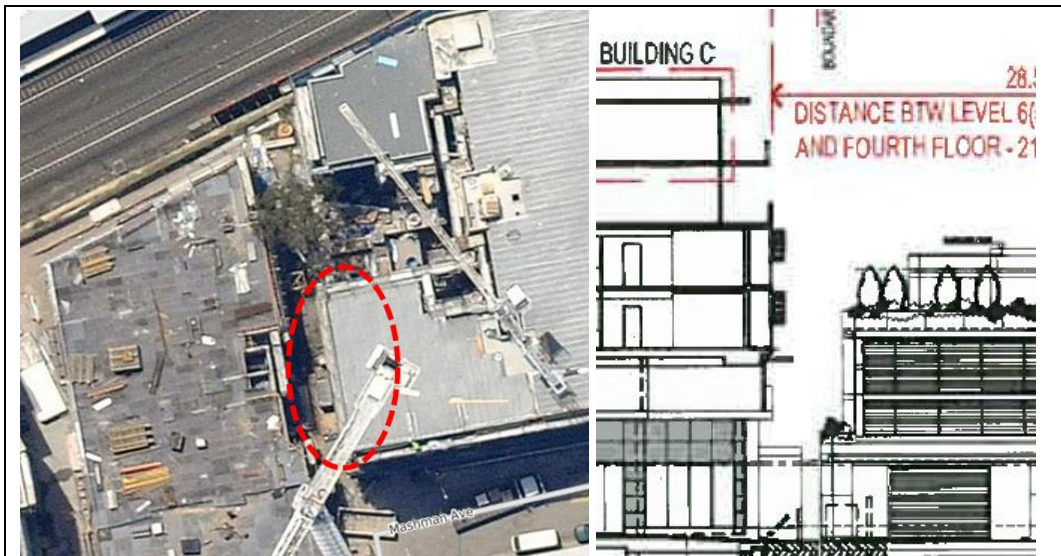


Figure 5: Relationship between Building C and adjacent development to the east

In brief, overshadowing impacts on neighbouring properties that can be attributed to the proposed additional storey height on Building C are very small, if not negligible.

5.0 SOLAR ACCESS

5.1 The relevant comments of the Panel are:

It is noted that the proposal as approved does not satisfy the requirements of the RFDC in terms of solar access.....The additional units now proposed would also not satisfy the standards.

5.2 **Solar access compliance of the approved apartments**

5.2.1 I have scrutinised the Applicant's characterisation of the approved design, and note that the compliance reported is:

Proportion of apartments with >3 hours sun between 9am and 3pm June 21	70 (58%)
Proportion of apartments with 2-3 hours sun between 9am and 3pm June 21	14 (12%)
Proportion of apartments complying with the RFDC	84 (70%)

I make the following observations:

- It appears that the Applicant carefully targeted the relevant compliance level, by a clear strategy of choice of apartment locations and types;
- It is legitimate for the Applicant to include a relatively low proportion of apartments that comply at the concessionary '2-hour standard', acknowledging that the western orientation makes achieving three hours impossible, and that the type of development results in a densely built up context.

I therefore agree with the Applicant's characterisation of compliance for the existing approval.

5.2.2 I infer that the Panel's comment is based on their interpretation of compliance taking Building C separately, and/or the impact of overshadowing by the adjacent building under construction to the east.

In my opinion, this approach has merit only in drawing attention to the difficulty of preserving complying solar access for a development when one of the site's favourable orientations is severely overshadowed by future neighbouring development.

I note that in the case of this site, the Applicant would have considered safeguarding their own solar access by 'flipping' the site plan east to west, but eliminated that massing option in order to achieve a complex combination of

other compliances, including a suitable transitional scale at the western boundary of the site by the use of the lower scale Building A. I entirely agree with that approach.

5.3 Solar access compliance of the proposed additional apartments

The Applicant reports the following solar access compliance for the proposed 12 additional dwellings:

Proportion of apartments with >3 hours sun between 9am and 3pm June 21	9/12 (75%)
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I make the following observations:

- The availability of the three hours of sun for the new top floor dwellings is premised on the provision of the same skylights in the proposed new roof of Building C, as were shown on the approved design;
- Some dwellings on Level 5 that previously experienced three hours of sun will now only achieve two hours between 9am and 3pm.

I have therefore adjusted the characterisation of compliance for the overall development with the proposed additional twelve dwellings as follows:

Proportion of apartments with >3 hours sun between 9am and 3pm June 21	71 (53.8%)
Proportion of apartments with 2-3 hours sun between 9am and 3pm June 21	25 (18.9%)
Proportion of apartments complying with the RFDC	96 (72.7%)

I note that the overall level of nominal compliance improves as a consequence of the additional Level 6 on Building C – and that those apartments are the most favourably located to be safe from future overshadowing by any further neighbouring development.

6.0 NATURAL VENTILATION

6.1 The relevant comments of the Panel are:

It is noted that the proposal as approved does not satisfy the requirements of the RFDC in terms of.....cross ventilation. The additional units now proposed would also not satisfy the standards.

6.2 Natural ventilation compliance of the approved apartments

The Applicant's characterises 89/120 (74%) of the dwellings in the approved design as complying for natural ventilation performance. I note that this characterisation relies on:

- The convention that two storey single aspect apartments and top storey apartments with ventilated skylights are counted as cross ventilated without further discussion;
- Proposing that a number of single aspect apartments of suitable design (shallow, multi-fronted, with multiple openings and articulated facades) may be assumed to have adequate ventilation equivalent to some cross ventilated apartments.

Given that natural ventilation compliance with the RFDC as it gives effect to SEPP65 can be relied on only for a general concept of amenity, but not for energy efficiency as determined under SEPP BASIX, I am of the opinion that the first of the above assumptions cannot be fairly ignored for this development when it is so generally accepted for others.

Similarly, I am prepared to endorse the second assumption, for suitably oriented apartments at a high enough elevation in a building. However, I think the Applicant applied the characterisation to at least some apartments, with which I would not agree, notably some west facing apartments in Building C. While these will have the benefit of the most energetic 'Southerly Busters', they will generally not be exposed to the range of summer cooling winds I normally consider a prerequisite for 'enhanced single sided ventilation performance'.

Notwithstanding this reservation, the number of apartments that I would not include in the compliance count is far less than the Applicant's claimed additional margin over the required 60% minimum. *I have not comprehensively re-scheduled the complying apartments, but confirm that the approved scheme can be fairly characterised as complying for natural ventilation amenity performance.*

6.3 Natural ventilation compliance of the proposed additional apartments

The Applicant reports natural ventilation compliance for the proposed 12 additional dwellings as follows:

Proportion of apartments with complying natural ventilation	8/12 (67%)
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I make the following observations:

- On Drawing No. 6126-S96-1-SK04 the applicant shows two east facing apartments as cross ventilated by way of openings in the main façade and in the adjacent north or south facing wall of the 'notch' in the main façade. As these apartments are well oriented to both north-east and south-east cooling breezes, high in the building, and enhanced by proposed ventilated skylights in the roof, I have no hesitation in agreeing to the characterisation.
- The same drawing also shows one west facing 'triple fronted' apartment as cross ventilated. As this apartment is also proposed to have the benefit of a ventilated skylight (preferably over the Kitchen portion of the Living area), it would be normally accepted as cross ventilated without special claims for enhanced single sided ventilation design characteristics.
- If all the apartments which are to be provided with skylights (for additional solar access over the otherwise available two hours) are specified to have them openable or otherwise ventilated, it is arguable that all twelve proposed apartments comply for natural ventilation amenity performance. However, in that case, a number of the apartments on Level 5 have to be conceded to lose the corresponding complying status.

Given the relatively conservative compliance level reported by the Applicant, I do not consider it justified to undertake a complete independent re-scheduling of projected natural ventilation performance. *In my opinion the proposed additional apartments are well located to achieve natural ventilation amenity, and do not adversely affect the overall compliance level of the development as a whole.*

7.0 CONCLUSIONS

7.1 Overshadowing

Scrutiny of the detailed SketchUp 3D digital model shows that in winter there is effectively no additional overshadowing of the approved public open space that can be attributed to the proposed additional storey on Building C. As the days lengthen towards the September Equinox, a barely perceptible difference in the area of shadow can be seen in the morning at 9am, reducing to negligible by mid-day, and not relevant during the afternoon. In summer, any additional shadow is actually advantageous.

Overshadowing impacts on both the plaza and on neighbouring properties that can be attributed to the proposed additional storey height on Building C are very small, if not negligible.

7.2 Solar access

The Panel's comments on solar access of both the approved scheme and of the proposed additional apartments is not supported by the detailed modelling, unless it is premised on considering Building C separately from the overall development, and/or giving additional weight to the impact of overshadowing by the adjacent building under construction to the east.

As I note in the discussion, the overall level of nominal compliance actually improves to 72.7% as a consequence of the additional Level 6 on Building C – and that those new top floor apartments are the most favourably located to be safe from future overshadowing.

7.3 Natural ventilation

The Panel has apparently taken the view that some apartment designs conventionally accepted as cross-ventilated (notably two storey single aspect, and top storey with ventilated skylights) should not be so counted. Their comment therefore characterises the approved scheme as not complying for natural ventilation amenity. In my experience this approach is inconsistent with other approvals.

As I note in the discussion above, the Applicant has reported a relatively conservative compliance level, and in my opinion the proposed additional apartments are well located to achieve natural ventilation amenity, and do not adversely affect the overall compliance level of the development as a whole.

In my considered opinion there is no issue of overshadowing, solar access or natural ventilation amenity compliance with the RFDC to prevent approval of the s96 application for an additional floor level on Building C of the development.

Table 1: Comparison of approved and proposed shadows

9am June 21	s96	
	Approved	

<p>12 noon June 21</p>	<p>s96</p>	
	<p>Approved</p>	

<p>3pm June 21</p>	<p>s96</p>	
	<p>Approved</p>	

<p>9am Sep 21</p>	<p>s96</p>	
	<p>Approved</p>	

<p>12 noon Sep 21</p>	<p>s96</p>	
	<p>Approved</p>	

<p>3pm Sep 21</p>	<p>s96</p>	
	<p>Approved</p>	