# SEPP65 Amenity: Who are you kidding?

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## Who are you kidding?

Steve King

SEPPs WORKOUT
Getting up to speed on SEPPs 1, "5", 65, 71 and BASIX
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The title of my paper is deliberately misleading. Given the mood of many designers in the face of increasing regulation, I would imagine that the majority would read it as a sarcastic suggestion, that SEPP65 is probably not achieving its objectives. And that may well be so, but it isn't what I mean. One of the reasons I would not base a whole talk on that premise is that nobody actually knows — especially in the area of solar access, natural ventilation and possibly acoustics.

Rather, I want to reflect on how designers can demonstrate that the buildings they are submitting for approval are likely to achieve the very worthwhile amenity performance objectives of SEPP65, and how approving authorities may approach that same concern. I have spoken before at the NEERG Seminars about the difficulty of both demonstrating and assessing compliance with the solar access and ventilation controls as they are set out in the Residential Flat Design Code that gives effect to SEPP65.

So why pick a provocative title like "who are you kidding"? Because in my experience both designers and Council officers all too often get it wrong.

In the case of Council officers, offended by other exceedances in height limits or FSRs, the Rules of Thumb seem to become insuperable numerical hurdles, even when rendered meaningless by context or other considerations. As a consequence, development approval processes can become prolonged campaigns of attrition, often only resolved by the merit based determinations of the Land and Environment Court.

In the case of the designers, constrained by difficult sites and driven by their developer clients, compliance is often a matter of self-serving summary tables, which gloss over glaring shortfalls in the actual likely performance of buildings were they to be built as illustrated in hastily prepared development applications. Or, equally often, designers appear to throw themselves on the mercy of Council's discretionary planning powers — having satisfied those inflexible rules of thumb, they appear unwilling or unable to employ other means to demonstrate the very likely satisfactory performance of otherwise perfectly good buildings.

**SEPP65 and the RFDC: A performance based planning instrument**

Both parties tend to forget that the Residential Flat Design Code is a performance based instrument, as are DCPs and the BCA , and most contemporary compliance instruments in the built environment. Admittedly, this oversight may have its source in the fact that the performance based nature of the RFDC is never properly explained. However, it may be clearly inferred from what passes as a generic table of contents for the Information Sheets.

Thus, the Residential Flat Design Code is systematically structured to provide for every SEPP65 Principle:

- descriptive text defines the topic and explains why it is important
- objectives state what the resulting outcome should achieve
- directive text outlines better design practice guidelines and provides some possible design solutions for achieving the guidelines. The guidelines also provide support in assessing variations of the recommended standards
- rules of thumb recommend minimum standards as a guide for local decision making. Minimum standards may vary depending on local context issues and/or if development applicants are able to demonstrate that they have addressed the better design practice guidelines and achieved the stated objectives.
  *(Introduction, RFDC page 4)*

The parallel with the Building Code of Australia is not exact, in as much as the *Rules of Thumb* may *not* be interpreted quite as *Deemed to Satisfy Solutions*. Of course, much of the problem I am describing is due exactly to them being treated that way, mainly by planners employed both by the approving authorities, and by the applicants in preparing the Statements of Environmental Effects.

Designers, and the Commissioners of the Land and Environment Court do appear to better understand that the Objectives may be relied on to interpret the desired performance to satisfy the Principles of SEPP65. The problem for designers is that in spite of knowing this, they rarely seem to apply their knowledge in properly explaining their designs as part of the development application process.

We may safely assume that Council officers are mostly without the technical background to interpret building plans — at least for such arcane outcomes as the thermal comfort resulting from particular arrangements for natural ventilation. It is therefore not surprising that they are unwilling to do the detailed analysis necessary to uncover the compensating or mitigating performance attributes, on which their Councillors should base the discretion to ignore what appear to be non-compliances with the *Rules of Thumb*.

Especially in the matters of mandated minimum solar access for individual apartments, and expected natural ventilation performance as a part of the broader objective of energy efficiency, architects would be well served by developing a greater sophistication in how they apply the concepts and available analytical tools.

Most importantly, they should provide much better quality descriptive materials to the planners preparing the compliance tables. Alternatively they should prepare the relevant parts of such documents themselves. My genuine worry is that the main reason this is not happening as much as it should, is that architects have allowed the appropriate analytical skills to fall into disuse. Too often these days, architects or their planning consultants call on specialists like me, far too late in the design process. They seem to hope desperately that I will discover in their intuitions the technical basis for explaining the likely satisfactory performance of their buildings.

**Solar access**

Mandated minimum solar access requirements may be more stringent as required by the RFDC or by the local DCP, but they are similar in form and intent. In previous NEERG Seminar presentations, I have given detailed examples of preferred tools for adequately presenting and appraising compliance. In this paper I prefer to illustrate the broader issue of performance based response to those quantitative controls.

The Residential Flat Design Code sets out the following *Rules of Thumb*:

- Living rooms and private open spaces for at least 70 percent of apartments in a development should receive a minimum of three hours direct sunlight between 9 am and 3 pm in mid winter. In dense urban areas a minimum of two hours may be acceptable.
- Limit the number of single-aspect apartments with a southerly aspect (SW-SE) to a maximum of 10 percent of the total units proposed. Developments which seek to vary from the minimum standards must demonstrate how site constraints and orientation prohibit the achievement of these standards and how energy efficiency is addressed (see Orientation and Energy Efficiency).
  *(Rules of Thumb: Daylight Access p. 84)*

Admittedly with respect to the required *number of hours*, and the *limited times of day* during which those hours may be counted, the performance objectives are not as clear as they could be. This is more especially so as the Residential Flat Design Code seems to go out of its way to confuse the less sophisticated, by having *Rules of Thumb* which speak only about sunlight, under requirements for Daylight.

But the more technically sophisticated should know that this standard is reasonable. It is framed in this manner in order to:

- assure a minimum number of hours of sunlight when it is high enough in the sky to clear likely local obstructions, and
- when it has sufficient energy content to contribute meaningfully to comfort and amenity.

The most common problem is that designers almost always examine and present only what I call *nominal sun access*. By nominal sun access I mean that the glazing to which it is applied is simply oriented in such a way that it *might* receive the minimum number of hours of sun, *if* there are no obstructions, and *if* no account is taken of the optical properties of the glass itself.

However, the actual likely sun available is crucially affected by external obstructions such as:

- neighbouring buildings,
- evergreen vegetation that is the subject of other protection such as tree preservation orders, verandah overhangs and privacy walls,
- deep set reveals, etc.

Just for example, a designer may assume that a due East orientation will yield exactly three hours of sun access between 9am and 12 noon. However, a deeply set verandah typical of the sort of neo-Regency style often adopted for more expensive apartment buildings will reduce that available sunshine at the glazing line to typically less than 1 1/2 hours, with complete shading by 10:30am.

If the solar access becomes an issue of contention before the Land and Environment Court, it is also likely that it will be scrutinised in terms of

- whether the sun patch falling on glazing is a sufficiently large proportion of the glazing, and
- whether the sun's angle of incidence to the glazing is small enough to avoid total external reflections at all times claimed as complying.

With respect to the *minimum proportion of apartments* in a development that achieve compliance, no such clear underlying understanding can be formulated. Ideally, *every* apartment would achieve the complying standard. The idea that there is an acceptable proportion is simply an acknowledgement that other site limitations and urban design considerations may limit the opportunity to do so. Therefore, it is the designer's responsibility to properly explain the particular proportion achieved, without dissembling in relation to matters of commercial yield, so that Council's planning officers may properly exercise the discretion that this standard requires.

The Chief Commissioner of the Land and Environment Court, John Roseth, SC has gone so far as to set out principles to guide the determinations of the Court in this matter.

> Numerical guidelines should be applied with a great deal of judgment, keeping the following principles in mind, *where* relevant:
>
> - The ease with which sunlight access can be protected is inversely proportional to the density of development. At low densities, there is a reasonable expectation that a dwelling and *some of* its open space will retain its existing sunlight. At higher densities sunlight is harder to protect and the claim to retain it is not as strong.
> - The amount of sunlight lost should be taken into account, as well as the amount of sunlight retained.
> - Overshadowing arising out of poor design is not acceptable, even if it satisfies numerical guidelines. The poor quality of a proposal's design may be demonstrated by a more sensitive design that achieves the same amenity without substantial additional cost, while reducing the impact on neighbours.

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- To be assessed as being in sunlight, the sun should strike a vertical surface at a horizontal angle of 22.5° or more. For a window, door or glass wall to be assessed as being in sunlight, half of its area should be in sunlight. For private open space to be assessed as being in sunlight, either half its area or a useable strip adjoining the living area should be in sunlight, depending on the size of the space. The amount of sunlight on private open space should be measured at ground level.
- Overshadowing by fences, roof overhangs and changes in level should be taken into consideration. Overshadowing by vegetation should be ignored, except that vegetation may be taken into account in a qualitative way, in particular dense hedges that appear like a solid fence.
- In areas undergoing change, the impact on what is likely to be built on adjoining sites should be considered as well as the existing development.

*(Roseth SC: LEC 10225/04 - 30/06/04)*

These principles are not applied with great rigour at the coalface of local government, and even in front of the Court they may be interpreted with some flexibility. But they can serve both designers and assessing officers as an authoritative guide to interpreting the relevant quantitative standards summarised by the *Rules of Thumb*.

What neither the Residential Flat Design Code, nor the Commissioner's principles bring to the designers' or the Council Officer's attention is that in many circumstances it may be valid to consider sunlight falling on glazing between sunrise and 9am on one hand, or 3pm and sunset.

For instance, generally easterly oriented glazing in an elevated location could be reliably sunlit from shortly after sunrise. This early-morning sunlight would have the added attribute that it is near normal to the glazing. It is therefore of high utility value from the point of view of passive solar design in the Sydney climate, and likely to contribute markedly to amenity. Both Council officers and the Court in my experience look favourably on consideration of such additional sunlight, when determining compliance with the numerical standards. But designers should not expect assessing officers to discover the opportunity for such additional sun access on their behalf.

Favourable consideration should also be given to relaxed standards where appropriate. I have now had my expert opinion preferred a number of times, when pointing out that prospective residents of a beachside apartment block may be satisfied with less than three hours of winter sun, or even none at all, if their apartments can be shown to be otherwise complying with the energy efficiency objectives. Like other attributes of amenity, sun access should be viewed first holistically.

**Natural ventilation**

Predicting effective natural ventilation is an arcane expertise. Presenting or assessing likely compliance with the underlying performance objectives of the Residential Flat Design Code is admittedly much more technically difficult. Nevertheless, the exercise of a little good sense can often avoid a bizarrely bureaucratic application of the *Rules of Thumb*.

The Residential Flat Design Code gives the following quantified recommendation for interpreting SEPP65 with respect to cross ventilation:

- Building depths, which support natural ventilation typically range from 10 to 18 metres.
- Sixty percent (60%) of residential units should be naturally cross ventilated.
- Twenty five percent (25%) of kitchens within a development should have access to natural ventilation.
- Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms. *(*Rules of Thumb: *Natural Ventilation* p.87)

Chief amongst the offending rigidities in assessing natural ventilation is the mistaken belief that to have adequate natural cooling in the Sydney climate, it is always necessary to arrange for cross ventilation by way of openings in widely separated adjacent or opposing facades. In this approach, all so-called single-sided apartments are dismissed as non-complying. Sometimes absurd suggestions are made to applicants as to the provision of various configurations of two-storey crossover apartments, in order to artificially achieve the stated minimum proportion of technically cross ventilated dwellings. These suggestions are made by planners because they are given an overwhelming impression by the illustrative materials of the RFDC and the Government Architect's Pattern Book that such apartments are God's solution for everything.

A minimum of attention to prevailing breezes, especially in the Sydney coastal strip, would confirm that apartments above a certain height are much more likely to experience wind *nuisance* than they are to be short of ventilation potential. Clearly single sided apartments of suitable design in such locations, and oriented to almost any direction except the hot summer westerlies, should be considered complying — in as much as natural ventilation will reliably contribute the requisite cooling potential as part of an energy efficient design approach.

Wherever it may be justified, a much more detailed and sophisticated analysis of natural ventilation potential can be performed by a competent engineering consultant, properly employing CFD analysis.

Council Officers should, however, beware when presented by such analyses where they purport to justify badly oriented, usually two-storey apartments, on the basis of predicted *stack effect* ventilation. While the so-called stack effect is real in as much as it can achieve some air exchange on perfectly still days, it has three limiting conditions that render it virtually irrelevant in the Sydney climate. Firstly, it only works on vary still days, which are almost unknown in much of Sydney. Secondly, the inside of the apartment actually has to heat up significantly in order to drive the buoyancy effects on which stack ventilation relies. Thirdly, stack effect alone almost never produces the kinds of air velocity necessary to compensate for the extra rise in temperature.

A more detailed discussion is beyond the scope of this paper. For those interested, I covered the relevant concepts of the relationship between ventilation's role in cooling as air exchange, and the effect of air velocity in allowing people to tolerate slightly higher temperatures before turning on an air-conditioner, in a previous NEERG Seminar. I am sure that it is still available from the organisers

**Energy efficiency and air conditioning**

I want to conclude this discussion of the apparent bias in the Residential Flat Design Code to completely privilege cross ventilation for passive cooling, by drawing attention to the underlying objective of *energy efficiency*. While the objective of the Residential Flat Design Code includes amongst other things to discourage the use of the air-conditioning, it's use is not proscribed even under the imminent multi-unit BASIX regulations. Air-conditioning will indeed be supplied as part of apartments either because it is determined by the market, or because it is required to meet stringent acoustic controls. And now that an 8.4KW reverse cycle air conditioner costs rather less than a middling sized plasma television, air conditioning will continue to be enthusiastically retrofitted to those apartments not already sold with it.

It is fairly readily demonstrable that where apartments are to be air-conditioned, those apartments designed for cross ventilation are likely to have *higher heat losses in winter* **and** *higher heat gains in summer*. If this is counterintuitive, one only has to consider the significant additional wall and glazing areas typical of such apartments, compared to single aspect of apartments with similar apartments to both sides.

Where refrigerative air-conditioning is installed, the imperative in design switches from simply 'climate responsive design' to emphatically 'energy conserving' design. For all the badmouthing to which NatHERS ratings have been subject, they give very useful guidance as to the comparative likely energy conserving performance of apartments. Both designers and

assessing officers should make the effort to cross reference the NatHERS ratings and the ventilation design when considering the relevance of the cross ventilation rules.

**Conclusions**

Compliance with the provisions of the Residential Flat Design Code as it gives effect to SEPP65 is generally more complex than simply applying the quantitative standards typically summarised in the rules of thumb. In the case of solar access and natural ventilation both designers and assessing officers who fail to look at the underlying performance objectives do so at their peril.

The lack of appropriate technical background may explain why most planners may be unable to interpret the likely underlying performance of designs. Of course, this may result in approval of a building which is presented as superficially complying in spite of being unlikely to achieve the desired performance in reality, as easily as it often does in worthy schemes being given a hard time because they fail to add up on the arbitrary numbers.

The greatest need is for designers to take more seriously the *technically adept analysis, interpretation and presentation of the likely performance of proposed buildings*. When presented with a higher standard of compliance reporting then is common today, it would be safe to assume most Council officers are more likely to look favourably on development applications. The benefit to designers and their clients in time saved is likely to be significant.

It should not be necessary to emphasise that the proper application of such analysis earlier in the design process should also result in a higher proportion of the better performing buildings. Not only might it reverse the common public perception of architects' ever-diminishing competence to exercise technical responsibility in building projects, but the very worthwhile quality objectives SEPP65 may then be realised.