

DAYLIGHT MODELLING ADVICE

Document No: S3476.04

Date: 21.9.2018

Zero Nine

Daylight Modelling Advice – 378-380 Smith Street, Collingwood

Sustainable Development Consultants have modelled the current design of the proposed residential development at 378-380 Smith Street, Collingwood using the 3D modelling program Autodesk Ecotect Analysis 2011 and the Radiance plugin.

This assessment has focussed on the bedrooms which are served by the north eastern light court, as well as testing one of the Level 1 south-facing apartments which has a view out via the existing façade.

The design was assessed against the desired daylight levels outlined under SDAPP¹ Indoor Environment Quality guidelines. For residential dwellings, these levels have been defined as:

- $\geq 0.5\%$ daylight factor achieved across at least 90% of the floor area for bedrooms; and
- $\geq 1.0\%$ daylight factor achieved across at least 90% of the floor area for living areas (including kitchens).

These values have typically been accepted by councils and VCAT as being appropriate for the purposes of determining good daylight access.

The modelling has been undertaken based on the current surrounding conditions for the sites to the north and east. An alternative scenario to test how well the light court on the north east corner will perform under potential future neighbouring conditions has been modelled based on the building massing and setback drawings provided by Jackson Clements Burrows Architects, dated 21st September 2018 (see figures 1 and 2 below). The assumed setbacks and light courts for the neighbours to the north and the east would likely be the minimum required given their available frontages, shape of the lots and access to light. In this scenario, the neighbour to the north has been modelled with a reciprocal design to the proposed 378-380 Smith Street design but with a setback to the east boundary. Given the difference in zoning, the eastern neighbour is assumed as a 6-storey office building with a floor-to-floor height of 3.4m.

¹ SDAPP – Sustainable Design Assessment in the Planning Process.



Figure 1: 3D image of neighbouring buildings used in the potential future scenario.

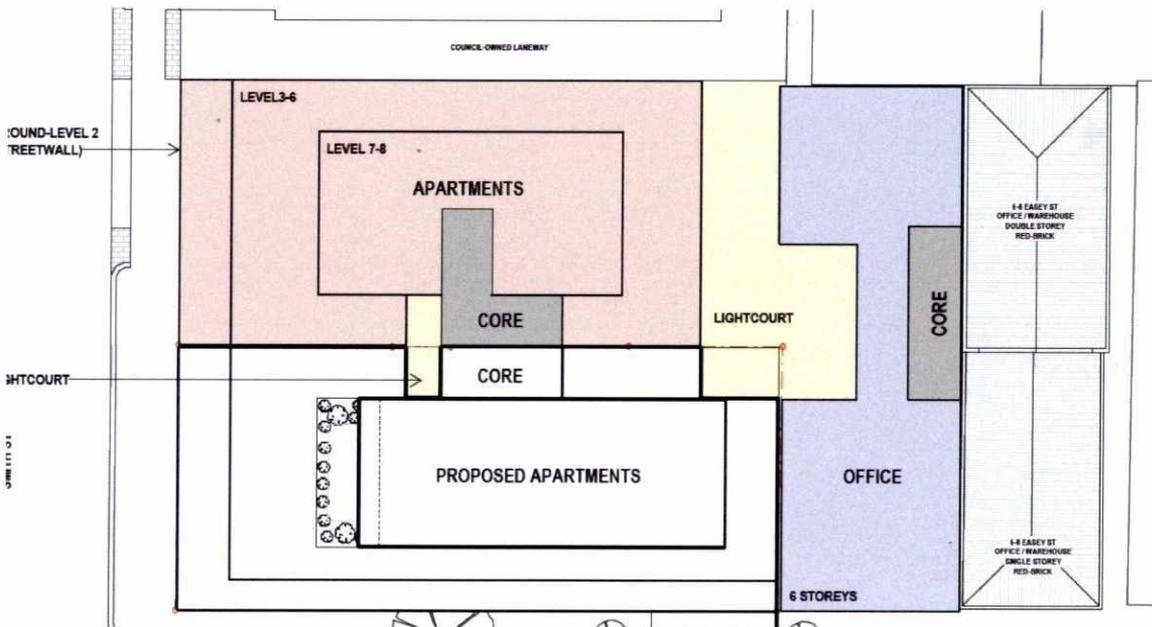


Figure 2: Aerial view showing light court formed by the potential neighbouring buildings.

Design and Performance

The development has been modelled in detail with the internal walls and windows built into the model for the selected apartments. All elements that could overshadow or reflect light into the subject bedrooms and living rooms are deemed important for the assessment and were included in the model.

The glazing to the light court windows was modelled being 2.6m wide for the north facing bedroom and 2.0m wide for the east facing bedroom. Both windows were modelled as 2.7m high with obscure glazing (VLT of 40%) to 1.7m above finished floor level for privacy. All remaining glass was modelled as standard clear double glazing (VLT 70%).

The apartment floors were modelled with a reflectivity of 0.3 (30%) as is typical for carpet or darker timber flooring; the Ground level terraces were modelled with a reflectivity of 0.3 (30%); and the balconies were modelled with a reflectivity of 0.4 (40%).

Ceilings were assumed as white with a reflectivity of 0.7 (70%).

The external walls were modelled with a reflectivity of 0.5 (50%) and the internal walls modelled as having a reflectivity of 0.7 (70%).

The modelling was undertaken using a uniform design sky which is used to generate daylight factors across the spaces being tested for compliance.

Please see the results of the modelling below for confirmation of the predicted daylight factors within the development and an analysis of the appropriateness of the design to provide good internal daylight amenity and energy efficiency (i.e. not relying on artificial lighting during the day).

In the results below, please note that common areas, wardrobes, bathrooms and corridors have been removed from the results for clarity.

Results

The figures below have the following colour scale:

- Yellow; over 1% daylight factor (acceptable daylight in bedrooms and living rooms);
- Red through to dark yellow; 0.5%-1% daylight factor (acceptable daylight in bedrooms, only acceptable in living zones if small amounts present); and
- Blue through to purple; <0.5% daylight factor (typically unacceptable in living zones, small amounts acceptable in bedrooms).

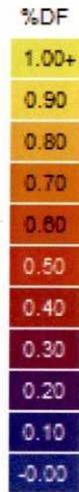


Figure 3: Colour scale of the daylight factors presented in the results below

North East Light Court – Current Neighbouring Conditions



Figure 4: Daylight modelling results for the Level 1 apartments based on the current surrounding conditions.

As can be seen from the result above, under the current conditions this light court is suitably sized to provide the desired daylight levels to these bedrooms. It has been assumed that all similar bedrooms on the levels above will perform equally well, if not better.



North East Light Court – Potential Future Neighbouring Conditions

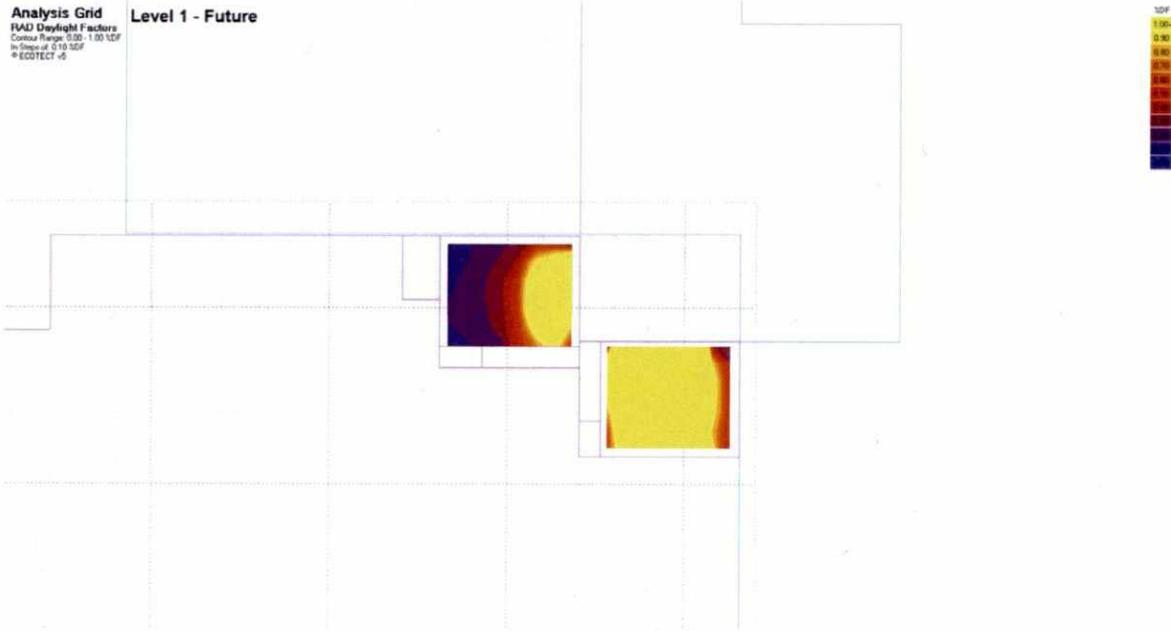


Figure 5: Daylight modelling results for the Level 1 apartments based on the future surrounding conditions modelled.

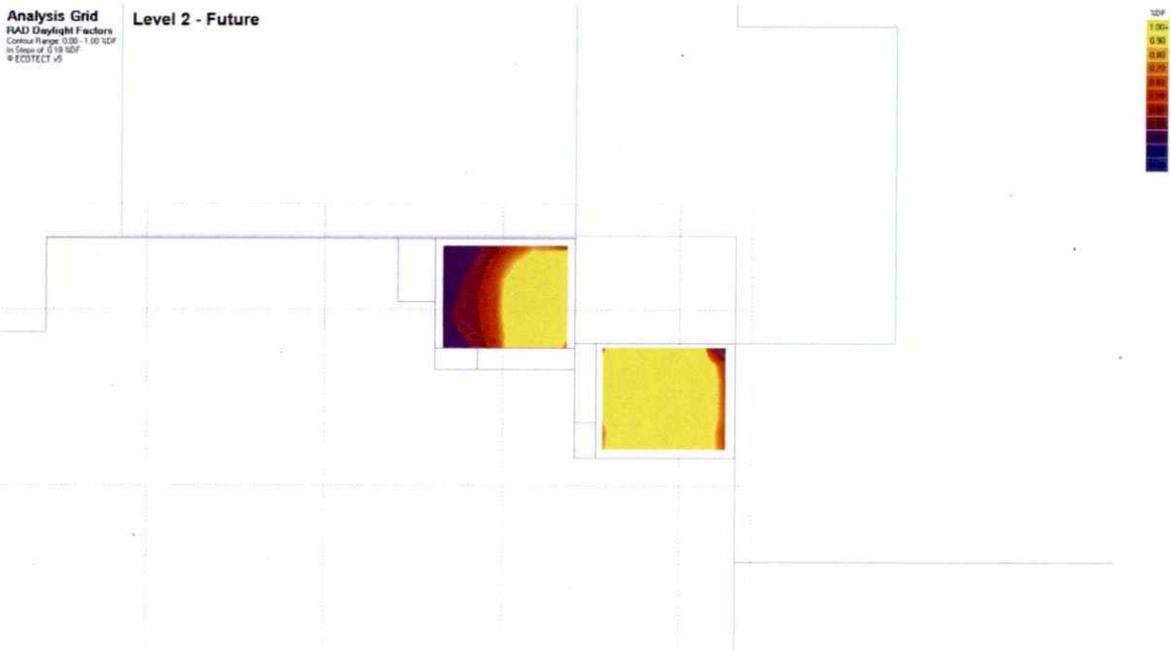


Figure 6: Daylight modelling results for the Level 2 bedrooms under the future conditions modelled.



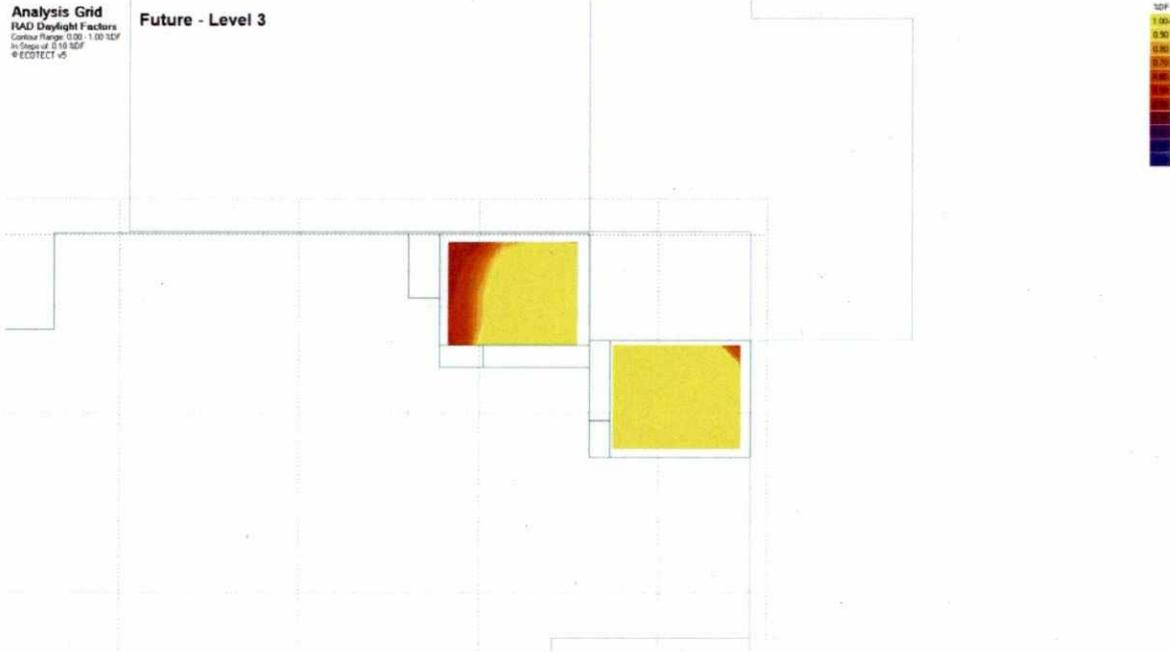


Figure 7: Daylight modelling results for the Level 3 bedrooms under the future conditions modelled.

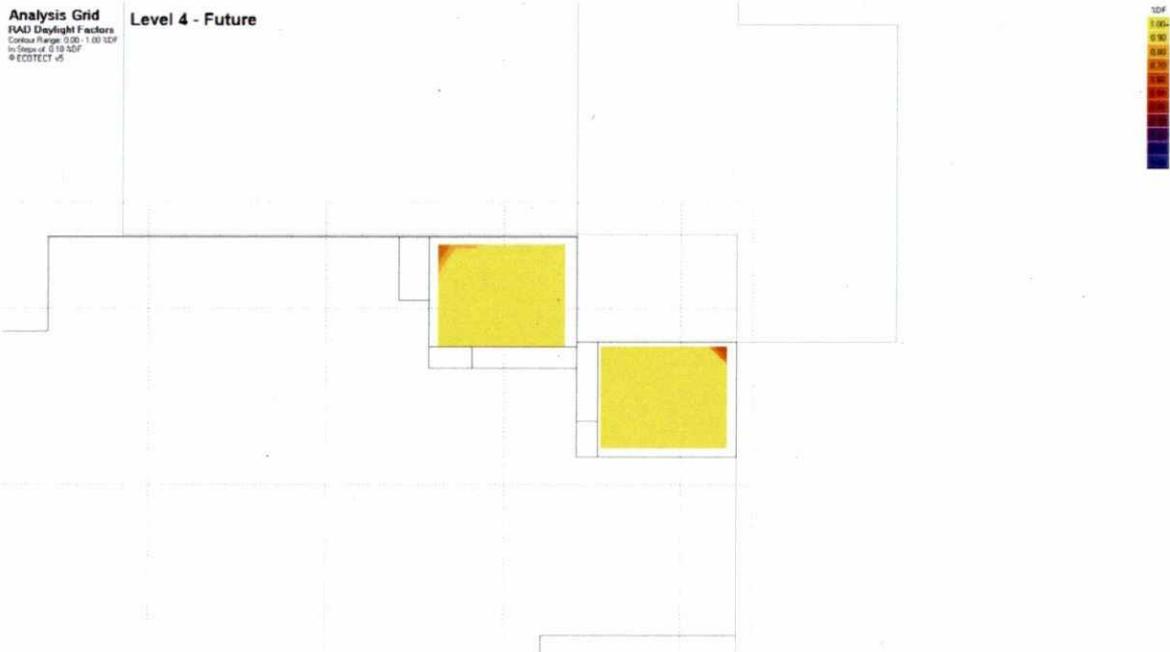


Figure 8: Daylight modelling results for the Level 4 bedrooms under the future conditions modelled.

The results above demonstrate that under the potential future conditions modelled, the north facing bedrooms served by the north east light court will achieve the desired 0.5% daylight factor across at least 90% of the floor area on all levels.

The east facing bedrooms fall short of meeting the desired daylight level on levels 1 to 3, but are shown to improve for Level 4 and above as the outlook to the sky begins to open up. While the lower level east facing bedrooms do not meet the desired daylight levels, they still receive an adequate level of daylight that could still be deemed suitable for this space type. It is also noted that due to the high performance of the north facing bedrooms, each of these lower level apartments will still be provided with at least one bedroom meeting the desired daylight levels. Additionally, these three bedrooms are the only bedrooms expected to not achieve the desired daylight levels, resulting in the proposed design providing the desired daylight levels to a total of 94% of bedrooms in the development.

South Facing Apartments



Figure 9: Daylight modelling results for a typical Level 1 south facing apartments based on the current plans

The result above demonstrates that the bedrooms of the south facing apartments on level 1 are essentially unaffected by the existing façade which is to be retained along Easy Street, as the bedroom modelled is shown to achieve daylight levels which exceed those typically desired for these spaces.

The kitchen/living area achieves a daylight factor of 1.0% or greater across the majority of the living space, however this is shown to decrease towards the rear of the room and subsequently falls just short of being provided to the 90% of floor area targeted. While not meeting the desired daylight level, this result could still be considered acceptable as both the proposed living space and kitchen area are provided with the desired daylight level, with only the study space towards the rear falling just below this. It is also noted that these level one south facing apartments are predicted to be the poorest performing apartments in regard to daylight amenity and therefore all other kitchen/living areas (90% total) are expected to meet the desired daylight levels.



Summary

Overall the development is expected to perform very well in regard to providing a high level of daylight amenity under both the current neighbouring conditions and under the potential future scenario.

The daylight modelling has shown that at worst the daylight amenity provided to the proposed apartments could still be considered adequate, and that more than 90% of the bedrooms and living rooms will be provided with the respective desired daylight levels.

If you should have any questions, please feel free to contact us at any time to discuss.

Regards,

Adam Redmond
Senior Sustainability Consultant

Sustainable Development Consultants
03 9882 9967
adam@sdconsultants.com.au

