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Consultant Advice Notice

Project:	Waterloo Metro Quarter – Building 3	**Project No.**	1024873
Subject:	Facade Shading Analysis	**Doc No.**	CAN-001
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Attention:	Project Team	**Revision:**	C

This Consultant Advice Notice provides a summary of a preliminary façade shading analysis for the Waterloo Metro Quarter Building 3 in response to DA comments from the City of Sydney on the effectiveness of the proposed shading strategy to the west facade.

The study is based on the layout and façade design of a typical west-facing studio. Façade solar irradiation under various shading scenarios is compared against the current DA design.

This CAN contains the following sections:

- Purpose and Limitations
- Reference Documentations
- Methodology
- Assumptions
- Simulation Results
- Discussion

1.1 Purpose & Limitations

The study is to assess the effective impact of the proposed shading strategy on the solar irradiation on the external face of the window during the summer months (December to February).

The study is not an energy model or a thermal comfort model. This will be undertaken separately for the proposed design to demonstrate compliance with NCC Section J1 using the JV3 assessment route.

The study does not consider other measures used to control solar gain in the studios including:

- Window wall ratio to minimise area of glazing.
- High performance double glazing with a Solar Heat Gain Coefficient (SHGC).
- Reflectivity of internal blinds to control internal radiant temperatures.

1.2 Reference Documentation

The building plan and façade details are modelled based on the drawings/documentations below.

- EOY WIP Architectural drawing set dated 17/12/2020

1.3 Geometry

A 3D geometric model of the studio was built in Rhino. The façade of a typical west-facing apartment (Studio 3.11) is selected as the Base Case. The layout and façade details modelled are as below.

Figure 1 Typical Apartment for Façade Thermal Analysis - Studio 3.11

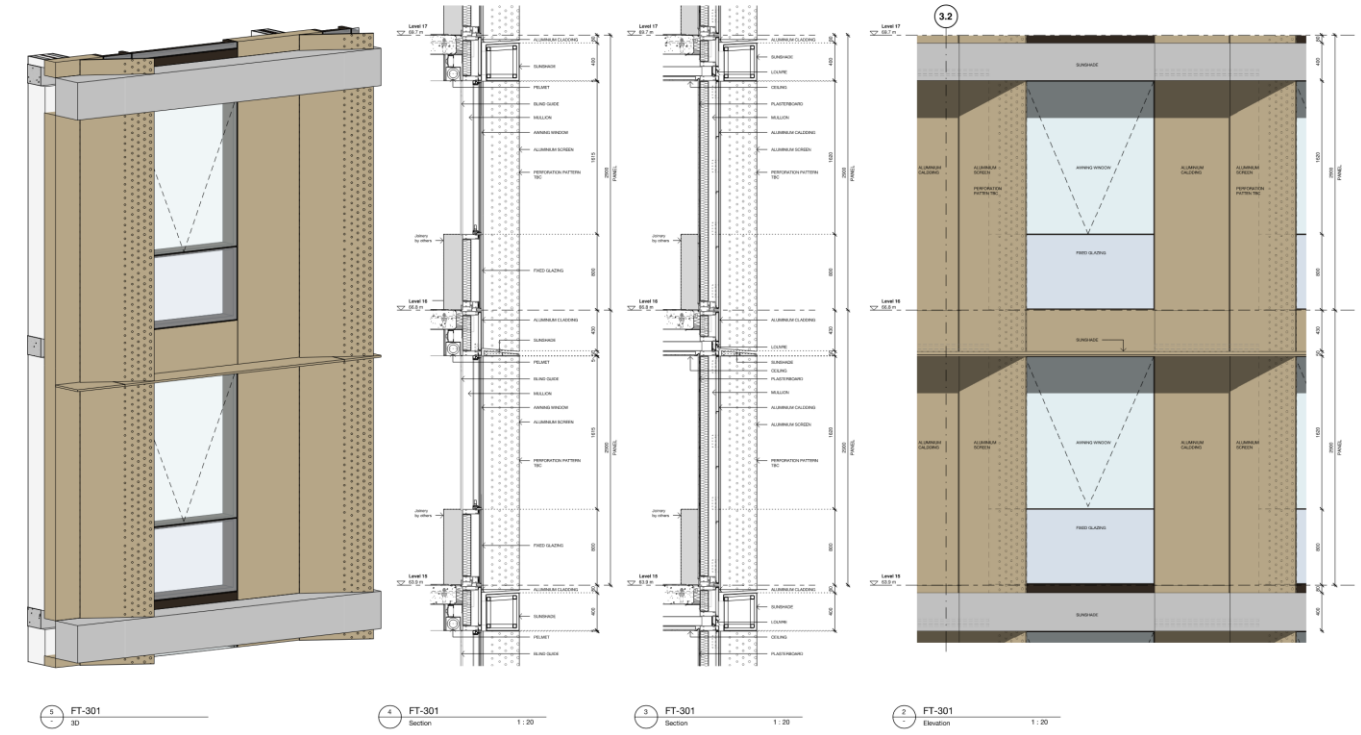


Figure 2 Façade Details of the Typical Apartment

1.4 Assumptions

The following assumptions were made for the analysis.

1.4.1 Weather Data

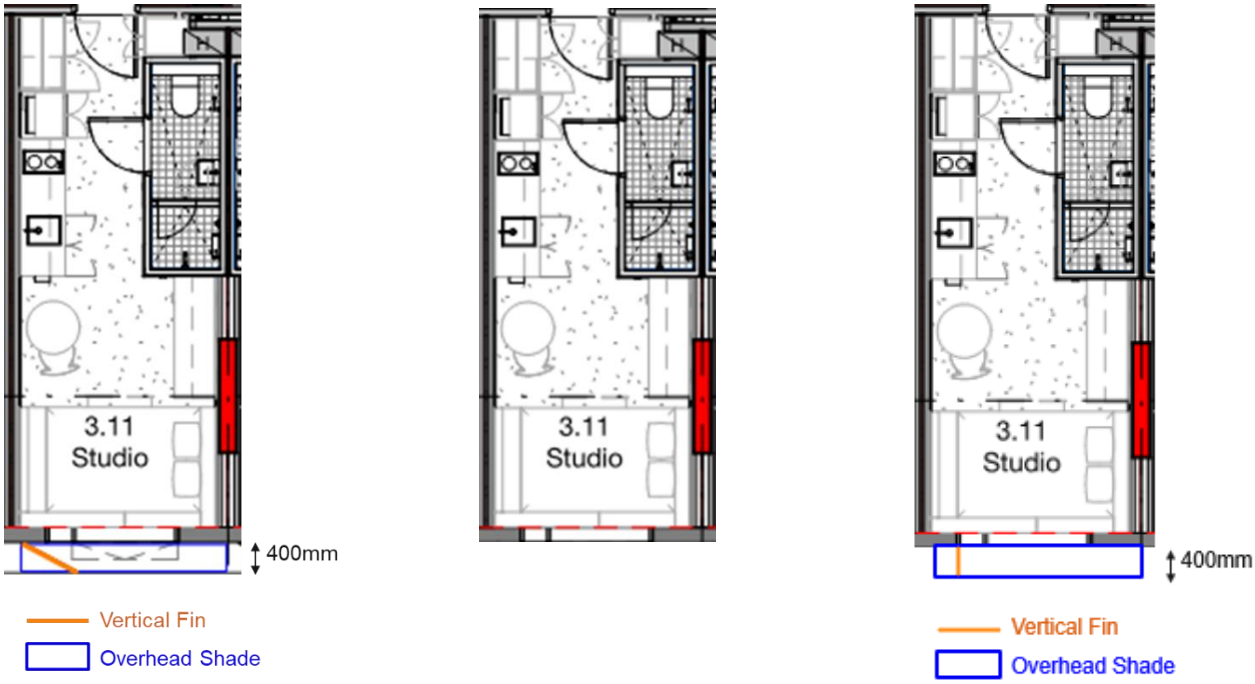
Hourly weather data is extracted from the weather file for Sydney - NSW Sydney 947670 International Weather for Energy Calculation (IWEC)

1.4.2 Analysis Period

The analysis covers summer months (01 December – 28 February) as cooling demand will be highest within this period of the year.

1.5 Design Options

The details of the analysed design options are illustrated below.



Base Case (Current Design)

Test 1 – No Shading

Test 2 - 400mm Vertical Fin (perpendicular) & Overhead shades

Figure 3 Design Options

1.6 Simulation Results

The solar irradiation falling on the window face in summer months is estimated for each case and summarised below.

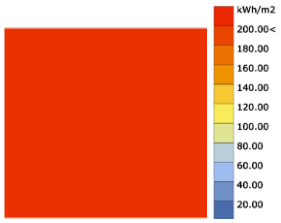
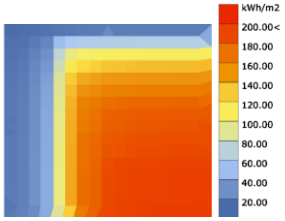
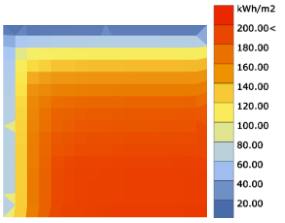
Case	Description	Solar Irradiation on Window (kWh/sqm)	Solar Irradiation Distribution on Window (Elevation View)
Test 1	No Shade	193.4	
Base Case	400mm Vertical & Overhead shades (Current Design)	108.1 (45% reduction)	
Test 2	400mm Vertical Fin (perpendicular) & Overhead shades	137.4 (29% reduction)	

Table 1 Simulation Results – Solar Irradiation Distribution on Window for Study Period 1 Dec – 28 Feb

1.7 Discussion

The shading study illustrates the following:

- The current design (400mm shading depth) reduces the solar irradiance on the external face of window by approximately 45% compared to unshaded window.
- The angled vertical fin as per current design protects the window from solar irradiance more effectively over a perpendicular fin of the same depth.

Based on this study we consider the shading scheme on the western façade, as per EOY WIP Architectural drawing set dated 17/12/2020, which is the combination of the below, as *effective* when compared to no shading, or perpendicular fins:

- 400mm angled vertical fin and,
- 400mm deep overhead sunshade