RWDI Australia Pty Ltd
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# MEMORANDUM

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| **DATE:** | February 9, 2021 | **RWDI REFERENCE #:** 1904405 |
| **TO:** | Anthony Witherdin | Director, Key Sites Assessments - DPIE |
| **FROM:** | Kevin Peddie | **Email:** kevin.peddie@rwdi.com |
| | Michael Pieterse | michael.pieterse@rwdi.com |
| **RE:** | **Solar Access – City of Sydney Review Response**<br>**Waterloo Metro Quarter – Building 2** | |

Dear Anthony,

It is understood that after submission of the planning documents for the Waterloo Metro Quarter development, commentary has been provided on the submission. The comments received are noted below, with commentary in response discussed in this memo. This document is an addendum to the submitted Appendix OO – Solar Access report for Buildings 2.

## City of Sydney Comments

Item 18 of the City of Sydney comments under the heading Amenity – central residential building pertains to the Solar Access requirement of the Apartment Design Guide and noted the following:

*Solar access – Objective 4A-1 of the Apartment Design Guide (ADG) recommends, as a minimum, 70% of apartments be provided solar access to living rooms and balconies for at least two hours during midwinter. The application states that 57% of apartments achieve the design criteria. The City does not support the applicant's justification for the non-compliance by including solar access after 3pm as this is not reflected in the design guidance or criteria and is of little thermal benefit due to the low altitude of the sun.*

*No information is provided to illustrate alternatives to achieve compliant solar access within the widely accepted criteria (9am to 3pm) such as staggering the floor plate to allow sun ingress from 1pm. Winter sunlight is generally discounted outside 9.00am-3.00pm as it is of little thermal benefit due to the low altitude of the sun. The more detailed solar information in the architectural design report demonstrates that even at 1.30pm, sunlight is too oblique to the facade and there is no benefit to extending the assessment criteria:*

*The tally incorrectly includes apartments as complying where only the living room glazing meets the criteria, rather than both living room glazing and balcony. This is not a correct interpretation of the ADG, which requires both to achieve a minimum of 2 hours of sunlight in order to be counted in the minimum 70% of apartments. This applies to both west facing apartments, and apartments at lower levels in the northeast corner of the plan, which are shaded by the southeast corner of Building 1. These apartments have been counted where*

*only the balcony achieves the minimum amount of sunlight (loss of 3 apartments). The stated solar access tally is incorrect and should be updated to reflect a correct interpretation of the ADG design criteria. It is likely to be well below the minimum when measured correctly.*

*The non-compliance is a symptom of the site planning, locating the commercial office building adjoining the northern boundary and obstructing solar access to the residential apartments to the south. The City therefore raises concerns with the appropriateness of SSD-10441 regarding Objectives 3A-1, 3B-1 and 4A-1 of the ADG.*

## RWDI Clarifications

A Solar Access Study was undertaken for the residential apartments associated with Building 2 of the development. Section 8 – Assessment and Findings, of the report outlined the results of the modelling, noting the number of apartments which will have access to direct sunlight on June 21 between 9:00am and 3:00pm. The results provided an initial summary of the number of apartments which satisfied both direct sunlight to the living space as well as the private outdoor area, as well as a breakdown of each component. For Building 2, this was further broken down to note the number of living spaces which had access to direct sunlight and number of private outdoor spaces, in isolation to each other and is summarised below for reference.

| Number of Apartments | Assessment Scenarios between 9:00am and 3:00pm |
|---|---|
| 57%<br>(85 out of 150) | Apartments which receive at least 2hrs of sunlight access to the living space windows **AND** private outdoor areas |
| 65%<br>(97 out of 150) | Apartments which receive at least 2hrs of sunlight access to the **living space windows** |
| 59%<br>(89 out of 150) | Apartments which receive at least 2hrs of sunlight access to the **private outdoor areas** |

| Number of Apartments | Assessment Scenarios between 9:00am and 3:30pm |
|---|---|
| 80%<br>(120 out of 150) | Apartments which receive at least 2hrs of sunlight access to the living space windows **AND** private outdoor areas |
| 80%<br>(120 out of 150) | Apartments which receive at least 2hrs of sunlight access to the **living space windows** |
| 87%<br>(130 out of 150) | Apartments which receive at least 2hrs of sunlight access to the **private outdoor areas** |

The alternative design options considered by the architect have been addressed in a separate design addendum document prepared by the project architect.

As noted in the response to submission prepared by the project architect, the Stage 1 Concept Plan noted a number of apartments which di not have access to direct sunlight due to the apartment primarily being located on the northern of southern aspect of the tower. The proposed scheme has positioned the apartments on the eastern and western aspect, significantly improving the overall amenity of the apartments for the building.

**Solar Irradiance**

The Bureau of Meteorology has a sparse network of ground stations which measure one minute statistics on a range of solar parameters including direct, diffuse and global solar radiance and terrestrial irradiance. A review of the one minute data has been undertaken for the winter period (May, June and July) at the closest ground station in terms of distance (Wagga Wagga), as well as the closest station in terms of latitude (Mildura) to the project site. The one minute data is presented as hourly steps, whereby each hour's value represents the mean of the mean of the one minute recording. A ground station with a similar latitude would provide the closest comparison to the project site.

The direct normal solar irradiation for the two sites is noted as follows. A linear interpolation could be used as a conservative assessment for the time intervals the times noted below (given that the solar irradiance level will have a logarithmic decay rate). For example, 3:30pm at the Mildura station (the closest equivalent to Sydney) the direct normal solar irradiance level would be approximately 83.5-88% of the direct solar irradiance level experienced at 3pm.

| Station Location | Direct Normal Solar Irradiance (% variance) | | |
|---|---|---|---|
| | 3pm | 3:30pm *(interpolated)* | 4pm |
| **Mildura** *(Closest site in terms of latitude)* | 100 % | 83-88 % | 67-76 % |
| **Wagga Wagga** *(Closest site in terms of distance – further south)* | 100 % | 71-79 % | 43-59 % |

The difference in solar irradiance levels between 3:00pm and 3:30pm highlights the marginal variance between this time step in the winter period. Further to this, the slightly lower angle of the sun at this period will provide greater solar penetration into the apartment instead of just at the glazing line. It is also expected that the daylight levels within the western facing apartments will be suitable given the exposed nature of the western aspect to the open sky. This is also aligned with the Objective 4A-2 of the ADG which notes that Daylight access is maximised where sunlight is limited.