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Level 1
110 Mount Street
North Sydney, NSW, 2060

August 24th, 2009

Attention: Mr. Paul Reidy
Building Envelope Solar Access Report – Whaling Street Solar Impact Study
Site: 88 Walker Street and 77-81 Berry Street, North Sydney

Overview

New development of any form changes how sunlight is allowed to reach the areas around the development. This report describes the expected impact upon solar access that will occur upon the residential area to the east of North Sydney CBD with the proposed development of the sites of 88 Walker Street and 77-81 Berry Street.

Solar modelling predicts that a small number of residences in Whaling Street to the east of the North Sydney CBD will be affected for several minutes at midwinter. Number's 1, 3 and 5 Whaling Street are predicted to receive up to ten minutes overshadowing during the winter between 9 am and 3 pm at June 21.

Premise for Analysis

Analysis is carried out using three dimensional digital land model of existing natural and manmade built form oriented to true north and Australian Height Datum. By modelling the theoretical position of the sun using accepted solar predictions and modelling the proposed development the expected shadows can be projected and analysed for potential shadow impact.

Accuracies

Existing landform and builtform – Three dimensional modelling of the landform and builtform is typically to a few centimetres of accuracy but it should be noted that some elements especially in residential areas such as fences and permanent hedges may be missing from the three dimensional model.

Proposed Buildings or Building Envelopes- Whilst an envelope or proposed building position can be shown to millimetres the solar study accuracy and the accuracy of any calculated building envelope is always going to be a direct result of the above two parameters. Envelopes can be calculated using techniques of reverse engineering to determine the potential developable envelope by assessing the shadow it will need to not create. The calculations upon which this engineering is based relies upon interpretation of the abovementioned existing landforms in the three dimensional model and its inaccuracies. Conversely, predicted shadows from proposed buildings have inherent inaccuracies due to the same effects.

As a result the accuracy of the potential envelope or the accuracies of predicted shadows upon the ground will vary depending upon the nature of the landform being interpreted, the accuracy of survey at that point, whether or not there is full and complete survey detail in this area, and finally the times of the days and years at which the area is potentially under shadow.

Astronomy – solar position mathematics area accepted from sources considered reliable such as NASA and Greenwich Observatories however solar predictions do vary both from observatory to observatory and year to year. Whilst this variation is generally considered small it can have significant effect (up to several metres) when calculating potential envelopes for high rise buildings. A third and important parameter is that the sun is treated as a point source of light for shadow calculations which again can distort the predicted reality and resultant reliability of the calculated envelope. The solar angles used in this report are based upon Senol Gulgonal's equations which are typical values however other observatories may vary by up to one degree which equates to a positional shift of shadow on the ground of several metres.

Extent of Solar Impact

Solar impact over the abovementioned residences as a result of the proposed development at 88 Walker Street consists of increased overshadowing between 2:52 pm and 3:00 pm during the winter period. As shown in the graph below the overshadowing commences on May 4th with an increase in shadow of one minute gradually increasing to a calculated maximum of eight minutes at the Winter Solstice.

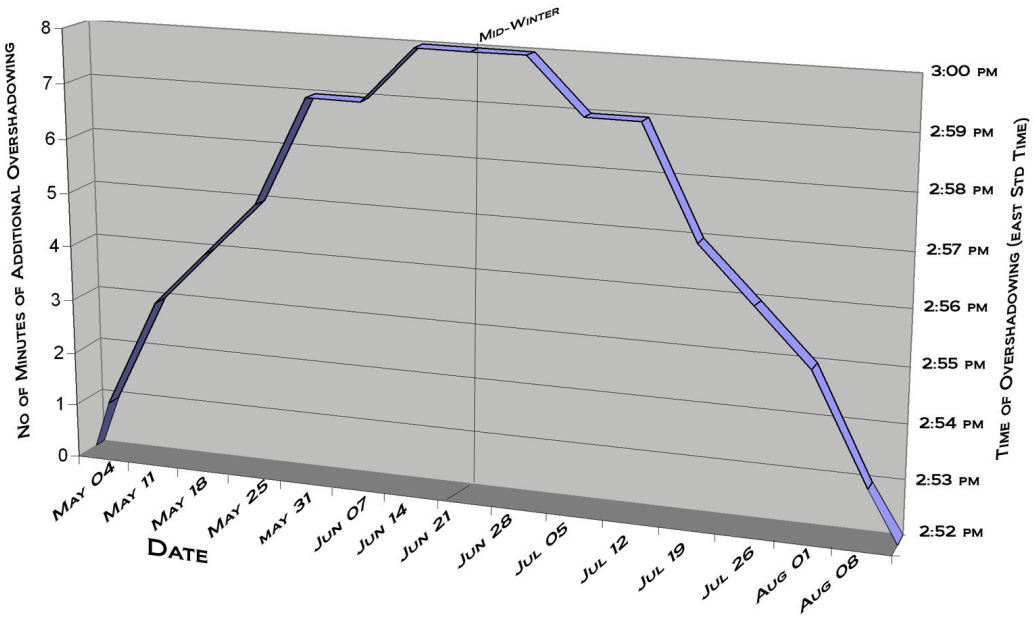

Diagram Showing Predicted Amount of Additional Overshadow Over Some Whaling Street Residences

Impact of Predicted Increase in Overshadowing Upon Required Daily Solar Access

Residences are required to have a minimum of three hours of sunlight at midwinter. As the chart below shows the front gardens of all three affected residences are in full sunlight between 9:00 am and 3:00 pm without any effect from the proposal, similarly, any living area facing the street has access to uninterrupted sun between 9:00 am and 3:00 pm, again without any impact from the proposal. Rear gardens of all three residences have solar access to an average of at least fifty percent of each rear garden between 9:00 am and 3:00 pm at present. The proposed development will introduce some overshadowing in accordance with the above graph no earlier than 2:52 pm concluding that the proposed overshadowing will not cause the affected residences to have less than the required three hours of solar access.

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Chart Showing Percentage of Available Areas Receiving Sunlight at Mid-Winter

No 1 Whaling Street

Percentage Solar Availability	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	2:45 PM	3:00 PM
Front Garden: Private Open Space	100	100	100	100	100	100	100	100
Rear Garden: Private Open Space	0	60	65	75	80	85	85	70
Front Internal Living Area	100	100	100	100	100	100	100	100

No 3 Whaling Street

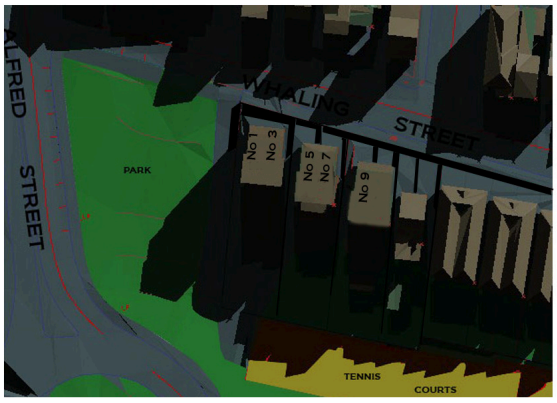
Percentage Solar Availability	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	2:45 PM	3:00 PM
Front Garden: Private Open Space	100	100	100	100	100	100	100	100
Rear Garden: Private Open Space	0	40	65	75	90	80	85	70
Front Internal Living Area	100	100	100	100	100	100	100	100

No 5 Whaling Street

Percentage Solar Availability	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	2:45 PM	3:00 PM
Front Garden: Private Open Space	100	100	100	100	100	100	100	100
Rear Garden: Private Open Space	0	10	40	65	80	70	80	60
Front Internal Living Area	100	100	100	100	100	100	100	100

No7 Whaling Street

Percentage Solar Availability	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	2:45 PM	3:00 PM
Front Garden: Private Open Space	100	100	100	100	100	100	100	100
Rear Garden: Private Open Space	0	10	40	65	80	70	80	70
Front Internal Living Area	100	100	100	100	100	100	100	100



EXISTING 9:00 AM

EXISTING 12:00 PM

EXISTING 3:00 PM

PROPOSED SHADOW IN INCREMENTS 2:50 PM - 3:00 PM

VISIBLE INFORMATION MANAGEMENT

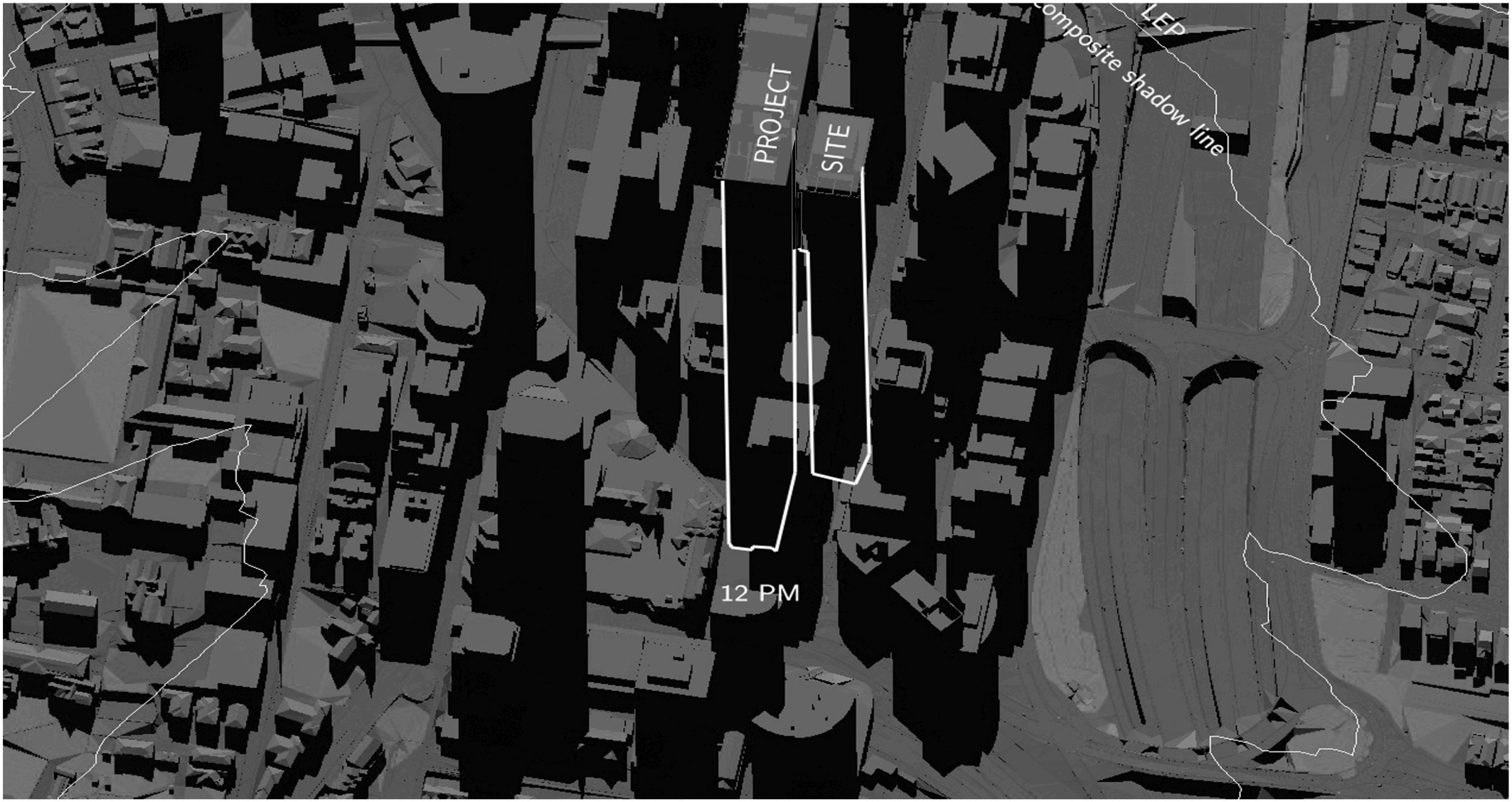
PSN Matter- Level 21 201 Miller Street North Sydney NSW Australia 2060

NORTH

SOLAR STUDY DIAGRAM.
88 Walker Street, North Sydney

Refer to Notes Page Regarding Solar Shadowing Conditions and Restrictions

PSN Matter
Measurement Mapping & Surveying



Winter 12pm

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