Aurecon Australasia Pty Ltd
ABN 54 005 139 873
Level 5, 116 Military Road
Neutral Bay NSW 2089
PO Box 538
Neutral Bay NSW 2089
Australia

T +61 2 9465 5599
F +61 2 9465 5598
E sydney@aurecongroup.com
W aurecongroup.com

Memorandum

To	**Natasha Devlin (Investa)**	From	**Aurecon**
Copy	**Paul Reidy (Fitzpatrick + Partners)**	Reference	**256013**
Date	**20 December 2017**	Pages (including this page)	**1**
Subject	**10 Valentine Avenue – External Shading**		

EXTERNAL SHADING IMPACT: NOTE FOR DA SUBMISSION

The proposed development comprises of a 7storey commercial office building above car parking, located at 10 Valentine Ave, Parramatta, and designed by Fitzpatrick + Partners architects.

This memo relates to the impact of external shading on the Eastern façade of the building.

Aurecon has performed preliminary modelling to assess the impact of external shading on the peak heat loads, and subsequent HVAC demands, within the building. As summarised in the table below, the additional of external shading to the Eastern façade would have a negligible impact on the peak heat loads of the building.

Note: Table below shows the heat load calculations results for current design and with extra horizontal and vertical shading on Eastern façade.

	Current Design	500mm horizontal	500mm vertical
Heat load in overall building (kW)	662.7	655.1	656.3
Improvement in overall building (%)	-	1%	1%

Performed modelling has shown that the overall system load for the 7storey building reduces only by 1%.

If you require further information regarding this item please do not hesitate to contact the undersigned.

Regards,

Meg Szczerbik
Mechanical Engineer, Aurecon
T +61 94655444 **M** +61 428212601
Meg.Szczerbik@aurecongroup.com
Level 5, 116 Military Road, Neutral Bay, Sydney Australia 2089
PO Box 538, Neutral Bay, NSW 2089
aurecongroup.com

Prism Facades
ABN: 91 607 928 745
Level 1, 156 Clarence St
Sydney, NSW 2000
info@prismfacades.com.au
www.prismfacades.com.au

Australian Unity Investment Management
c/o Natasha Devlin
Investa
Deutsche Bank Place, Level 6, 126 Phillip Street,
Sydney NSW 2000

21st December 2017

Prism Reference: 17020-FALT-001(2)–Revision 2

Dear Natasha,

10 Valentine Avenue, Parramatta – Façade Statement for DA

Prism Facades have been engaged to provide façade design and engineering services for the proposed development at 10 Valentine Avenue, Parramatta. For the purposes of supporting the Development Application for the building, we advise the following:

Architectural Intent:

The façade concepts for 10 Valentine Avenue have been developed to:

- Provide an attractive and distinctive façade which responds to the local surroundings;
- Provide a high-quality, functional and durable facade which will continue to look good for the design life of the building;
- Maximise occupant views from within the building, particularly over the existing rail corridor;
- Maximise natural light within the building;
- Support the design loads and wind loads for the design life of the building;
- Provide a robust waterproof enclosure to all internal spaces;
- Maximise the NABERS and Green Star ratings;
- Meet all relevant local, state, and national regulations, Standards and Codes, including Section J.

The proposed façade for the office levels includes full-height glass panels with a profiled feature spandrel panel to create visual interest and break up the appearance of the façade. The north-west elevation of the office levels has horizontal sunshades to provide additional shading to the façade on the most exposed elevation.

The podium car park facade includes an undulating surface formed from vertical blades at shifting angles to create movement and interest from street level. The lobby will feature large frameless glass walls with vertical steel supports behind, and the adjacent café will feature a 'green wall'.

Façade Design / Construction and Buildability:

It is envisaged that the tower façade will be constructed from a prefabricated unitised curtain wall. On the northern and southern ends of the tower façade, the glazing will project beyond the corner of the building to form a feature wing wall over the height of the tower.

In order to ensure that the façade will achieve the desired structural and waterproofing performance, the proposed façade system will undergo thorough testing in accordance with the BCA.

The glass will be affixed to the supporting aluminium frame using structural sealant, which will provide robust structural support that has a proven track record of use throughout Sydney, and the rest of Australia.

The carpark façade will be supported on secondary framing fixed to the slab edges.

There are a wide range of experienced specialist façade subcontractors in NSW and Australia who have a proven track-record at supplying and installing these types of façade systems.

External Shades:

External shading has been assessed by the design team to determine its impact on the following:

- Building Energy Consumption (i.e. Mechanical Ventilation Loads);
- Green Star and NABERS targets;
- Compliance with Australian Standards;
- Occupant Comfort;
- Glare Control.

These assessments have shown that external shading on the north-west elevation in particular is necessary to satisfy the above objectives. On this basis, a horizontal sunshade has been incorporated into the proposed façade scheme at each level on this elevation.

The assessments have also shown that external sunshades on the other elevations will provide negligible impact to energy consumption, achievement of Green Star and NABERs targets or glare control. This is primarily due to the orientation of the building, which causes sunlight to strike the north-east and south-west elevations at low sun angles (i.e. early in the morning and late in the afternoon), at which time traditional horizontal and vertical sunshades will provide marginal benefit and minimal shade to the interior.

This view is illustrated by Aurecon's analysis of peak heat loads and subsequent HVAC demand, which shows that the overall peak building loads are reduced by approximately 1% with additional external shading on the north-east elevation. The results from their analysis are presented below:

	No Sunshades	500mm Horizontal Sunshades	500mm Vertical Sunshades
Peak Building Energy Usage	662.7 kW	655.1 kW	656.3 kW
Percentage reduction from `no sunshades' base case	-	1.2%	1.0%

Based on the above, issues relating to energy consumption and glare control must, in the first instance, be managed via careful selection of glass and internal blinds.

It is the view of the design team that the marginal benefit of external sunshades on the north-east and south-west elevations is undermined by their negative impact on views, detrimental effects on safe access and glass replacement, and significant embodied energy of the sunshades associated with material extraction, processing, manufacturing, transport and installation.

On this basis, the proposed façade scheme incorporates glass with very high solar performance, and external shading on the north-west elevation only. The design team are confident that the overall façade scheme as proposed will achieve the project objectives, and contribute towards achieving the project's targeted 5-star NABERS energy rating and 5-Star Green Star rating.

Glass Selection:

Based on the above, the glass for the tower will be carefully selected to control solar loads and shading, particularly along the north-east elevation. The tower glass is expected to be a high-performance low-e coated / double glazed unit. This type of glass will maximise daylight penetration into the building, while managing solar loads through the façade.

The glass will be selected to provide a balance of transparency and performance, while contributing towards the achievement of Section J, 5-Star NABERS and 5-Star Green Star, and is expected to have the following characteristics:

- Glass to be selected with an SHGC of max. 0.23;
- Glass to be selected with 30-40% transparency (Visible Light Transmission);
- Consideration to be given to selecting double glazing with a `triple low-e' high performance coating;
- Consideration to be given to providing internal venetian blinds on north-east elevation to better manage glare, while maintaining views out through the glass.

Reflectivity:

A solar reflectivity study has been completed by CPP. The façade will be designed in accordance with the recommendations within the CPP report so that the proposed façade arrangements will not cause discomfort or threaten the safety of pedestrians, motorists or rail traffic.

In accordance with this report, all materials used on the outside of the building will have a maximum specular external reflectivity of 20% or less, unless additional solar reflectivity studies show that greater reflectivity can be safely adopted.

Summary:

Based on our experience of similar projects in NSW, we are confident that the façade scheme presented will provide a high-quality installation, which is capable of complying with the Australian Standards, BCA, and relevant planning compliance criteria.

We trust that the above is clear – however please don't hesitate to contact us if you have any questions.

Yours sincerely,

Heather Webster CPEng
Director | Façade Engineer
Prism Facades

+61 401 756 616
heather.webster@prismfacades.com.au
www.prismfacades.com.au

Aurecon Australasia Pty Ltd
ABN 54 005 139 873
Level 5, 116 Military Road
Neutral Bay NSW 2089
PO Box 538
Neutral Bay NSW 2089
Australia

T +61 2 9465 5599
F +61 2 9465 5598
E sydney@aurecongroup.com
W aurecongroup.com

Memorandum

To	**Natasha Devlin (Investa)**	From	**Aurecon**
Copy	**Paul Reidy (Fitzpatrick + Partners)**	Reference	**256013**
Date	**2 February 2018**	Pages (including this page)	**1**
Subject	**10 Valentine Avenue – Modelled Performance Summary**		

Prepared For: Australian Unity Investment Management Administration
Prepared By: Aurecon– Zofia Kuypers

1 Introduction

The proposed development comprises of a commercial office building above car parking, located at 10 Valentine Ave, Parramatta, and designed by Fitzpatrick + Partners architects.

This memo responds to the queries raised in the Parramatta Council letter on 25 January 2018.

Aurecon have conducted modelling in relation to the building's façade, heat gain, the National Construction Code (NCC) Section J requirements, and energy consumption all driving the building's sustainability metrics of 5 Star Green Star and 5 Star NABERS Base Building Energy. Aurecon has provided previous advice on these matters in the following documents:

- Section J Report for DA Submission; Dated 13 September 2017
- External Shading Impact; Dated 20 December 2017

2 Building Energy Consumption

It is important to note that the building's energy consumption is a factor of many elements, and not purely shading. Overall, the building energy performance has been designed to exceed the NCC and Green Star benchmark buildings. The full extent of the building's elements have been thoroughly considered, which has led to the following design elements:

- A high performance façade (Low-e Double Glazed Unit - U-Value 2.9, SHGC 0.23)
- Efficient HVAC systems
- Efficient LED lighting and controls
- Shading on the North-West elevation

In the development of these designs, energy consumption has been a driving factor, of which solar heat gain is one of many contributors to the energy usage.

Aurecon confirm that all modelling of energy consumption of the building, based on the current DA designs, complies with and supports the following sustainability metrics:

- 5 Star Green Star
- 5 Star NABERS
- National Construction Code (NCC) Parts J1-J3 via the JV3 methodology

In relation to the above, we highlight the metric of the JV3 modelling under Section J of the NCC as this specifically relates to the building's actual façade and its impact on energy consumption. In this respect, the current modelling shows a total estimated HVAC energy reduction of 5% of the maximum NCC requirements. This is a significant improvement as the only variable in this model is the building fabric (as the modelling does not consider increased equipment efficiencies). This modelling proves that the current designs and façade selection significantly exceed the minimum NCC requirements. This relates to the designs as submitted in the DA.

We are confident that these metrics will be achieved with the current design, and advise that the modelling shows exceedance of the requirements, having a level of contingency which supports our confidence in the achievement.

3 Green Star and NABERS Targets

Aurecon confirm that the modelling of the current design indicates that the following sustainability metrics of the building will be achieved.

Current targets include:

3.1 Green Star

- 5 Star rating requires 60 points minimum
- Modelling of the current design shows 67 points (allowing 7 points contingency)
- Aurecon confirm the current building is designed to achieve, with sufficient buffer, a 5 Star Green Star Rating (Design & As-Built v1.1)
- The current pathway conservatively includes 5 points in the GHG emissions credit, this correlates roughly to a 30% reduction in total building energy compared to the Green Star benchmark building (which uses the NCC to set the benchmark).

3.2 NABERS

- 5 Star currently requires a maximum of 69 kg CO_2/m^2 annually
- Early stage modelling indicates the design will achieve closer to 60 kg CO_2/m^2 (significant contingency)
- Aurecon confirm the building is designed to achieve 5 Star NABERS

The above modelling has been undertaken on the building's design as submitted in the DA. We further confirm that this is supported by the whole design team following extensive design coordination.

4 Occupant Comfort

Occupant comfort has been modelled using the Predicted Mean Vote methodology. The PMV was assessed for each HVAC zone on the floor plate for all occupiable hours. The results show that acceptable comfort levels, based on current industry best practice, are met based on the current DA designs. To our knowledge, occupant comfort and PMV is not a key metric in any of the Council controls, statutory or authority requirements. If there are mandated levels of achievement required, please advise and we can reassess against this requirement.

Indoor Environment Quality (IEQ) forms part of the Green Star rating tool, with the points within IEQ contributing to the overall rating, but none being mandatory. Within the IEQ section of Green Star, the

building design is forecast to achieve 13 points (out of a maximum of 17 points), specifically including the 1 point for thermal comfort, again contributing to the achievement of the 5 Star Green Star rating.

In relation to the matter of solar angles raised in the Council letter, a slight adjustment was required on the architectural drawings, however Aurecon's assessment of occupant comfort relied upon its own modelling, and not the architectural drawing provided in December 2017. Therefore, no change was required to Aurecon's assessment of occupant comfort.

5 Glare Control

To our knowledge, glare control is not a key metric in any of the Council controls, statutory or authority requirements. If there are mandated levels of achievement required, please advise so that this can be considered.

Glare control forms part of the Visual Comfort section in the IEQ points under the Green Star rating tool. Within the IEQ section of Green Star, the building design is forecast to achieve 13 points (out of a maximum of 17 points), again contributing to the achievement of the 5 Star Green Star rating.

We confirm the comment made in the Council letter that glare control is not material to the requirements for external shading, and the building's energy performance has been considered separately from these matters.

6 Conclusion

In conclusion, the building as a whole, including all building elements, has been considered in the achievement of the sustainability metrics, and we confirm that all modelling of the building as currently designed will achieve, and likely exceed the required sustainability metrics of:

- 5 Star Green Star
- 5 Star NABERS
- National Construction Code (NCC) Parts J1-J3 via the JV3 methodology

We again confirm that external shading to the North-Eastern façade is not required to achieve the sustainability metrics.

If you require further information regarding this item please do not hesitate to contact the undersigned.

Regards,

Zofia Kuypers
Senior Sustainable Design Consultant, Aurecon
T +61 2 94655367
Zofia.Kuypers@aurecongroup.com
Level 5, 116 Military Road, Neutral Bay, Sydney Australia 2089
PO Box 538, Neutral Bay, NSW 2089
aurecongroup.com