RWDI Australia Pty Ltd (RWDI)
Suite 602, Level 6, 80 William Street
Woolloomooloo NSW 2011

Tel: +61 2 9437 4611
ABN: 86 641 303 871

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Attn: William Nemesh
Public Affairs & Planning
Fivex
Level 17, 275 Alfred Street,
North Sydney NSW 2060

C/- Ian Cady
Director
Mecone
Level 12, 179 Elizabeth St,
Sydney NSW 2000
icady@mecone.com.au
+61 411 957 292

Re: 275 Alfred Street, North Sydney
Appraisal of Reference Design Scheme
RWDI Project #2306419

Dear William and Ian,

RWDI has been retained to provide a technical assessment and recommendations with regards to the pedestrian wind effects associated with the site redevelopment of 275 Alfred Street, North Sydney ("Bayer Building) as part of the Planning Proposal (2020-74) of the Alfred Street precinct. Specifically, this letter provides a qualitative assessment of the wind impact of four additional stories on the existing height of the Bayer Building on site and considers the regional wind climate, the exposure of the site, and the impact of surrounding buildings and site topography on site conditions. Initial advice is based on the Reference Massing scheme received by RWDI in June 2023 (Report Ref: Design Report – Appendix to Alfred Street Planning Proposal, prepared by Grimshaw, dated 22/03/2019).

The Alfred Street Precinct is situated on the eastern side of the Warringah Expressway with the North Sydney CBD located to the west creating a clear physical and visual distinction from the North Sydney CBD. The wider area surrounding the Alfred Street Precinct is characterised by low-density residential buildings to the east to taller residential towers to the southeast along the harbour. The exposure of the existing site to regional prevailing winds is indicated in Image 1. The presence of high-rise buildings to the west in the North Sydney CBD offers protection from cold winter winds. However, the alignment of Bayer Building with respect to winds from the northeast and the changes in the local topography can create high wind effects at the southeast corner of the existing building. Wind shedding from the existing tower can also impact the comfort / safety along Alfred Street. The open exposure and relative alignment of the existing Bayer Building to the prevailing south winds can also lead to downwash and high wind effects at the southern corners of the building. Considering the prevalence of these winds, these effects are likely to occur throughout the year around the existing site.

Image 1: Exposure of Site to Regional Prevailing Winds
Left: Summer | Right: Winter

Based on our understanding, the proposed reference scheme, depicted in Image 2, is approximately four storeys taller than the current Bayer Building on the site. However, it is important to note that this increase in height is unlikely to significantly alter the existing wind conditions on the site. The updated design features, on the other hand, including built form articulation, the rounded corner profiles, and deep canopies / setbacks closer to the ground level, are likely to contribute to the improvement of site conditions.

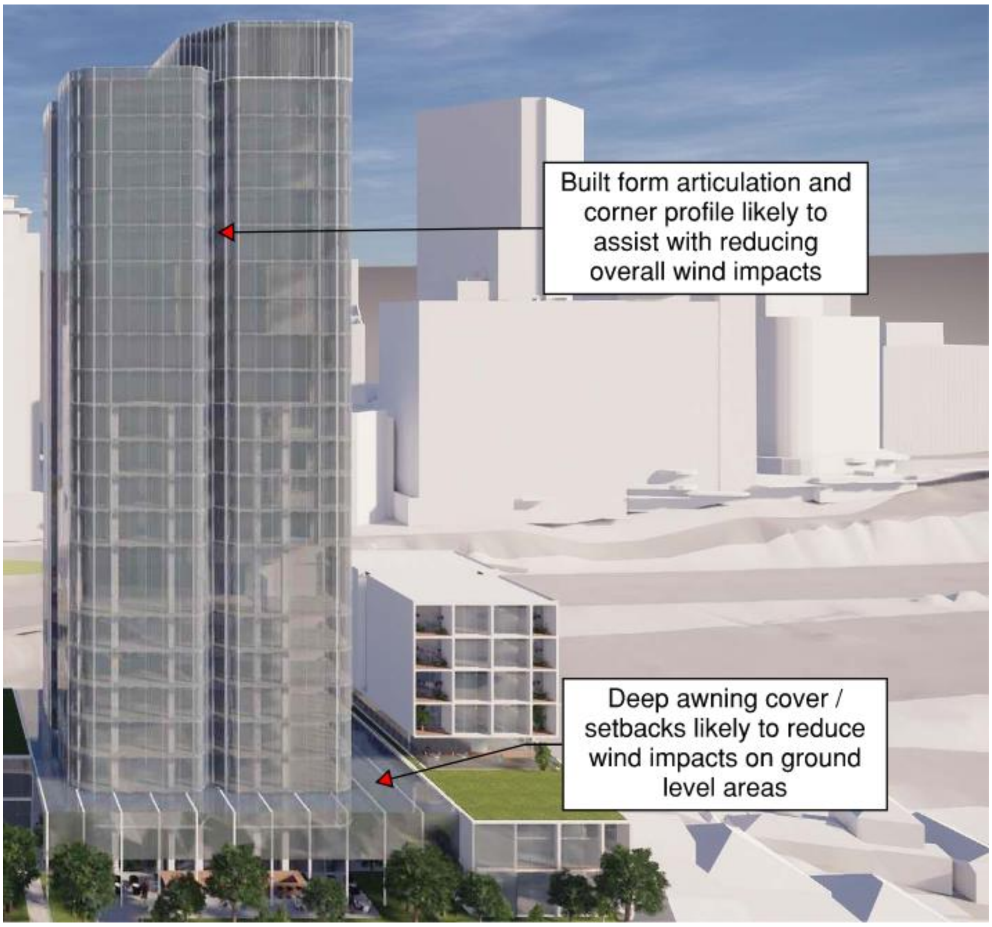

Image 2: Reference Massing Scheme (Grimshaw)

The following preliminary design advice can be used to ensure a comfortable wind environment is achieved around the site:

- Podium setbacks can reduce the intensity of downwashed winds onto the ground plane and are recommended along the southern and eastern aspects of the Site B tower. An alternative approach can be the use of deep awnings closer to the ground level along the southern and eastern aspects of the Site B building. Note that any gaps in the awnings should be avoided or, if incorporated, should include trees with dense foliage to fill the gaps.
- The Site B tower planform should avoid the use of sharp corners which can increase downwash and side-stream effects, if possible. Sharp corners can create high pressure differentials that can lead to wind accelerations. Examples of suitable corner profiles may include rounded, stepped, or chamfered corners on the tower planform. The building design can, for instance, explore aerodynamic planforms that can induce the winds to flow horizontally. Corner chamfering or rounding, for instance starting at 3-5m, can be used to counter adverse wind conditions (if needed).
- The overall built form is expected to dictate the major wind flow patterns. Therefore, built form articulation in the form of recesses or deep grooves, geometry changes and façade elements such as wind shelves/horizontal fins can be used to break up the strength of the wind passing around the tower and reduce the impact of downwash to some extent by inducing horizontal wind flows. However, any such elements / features should not create a high risk of wind-induced noise. Furthermore, note that these features generally have a localised impact and should be situated strategically across the exposed façade of the Site B building (i.e., south and east aspects). The southeast corner of the Site B building will also benefit from local articulation using vertical screens or façade recesses to break up the winds as they wrap around the corner, as shown in the examples in Image 3.
- Entrances to the buildings and retail units should be situated away from building corners to reduce wind exposure. Other measures can include recessing the entrance within the building form or including landscaping / screening in the vicinity of the entrances to provide protection to pedestrians exiting the controlled indoor environments. Examples shown in Image 3.

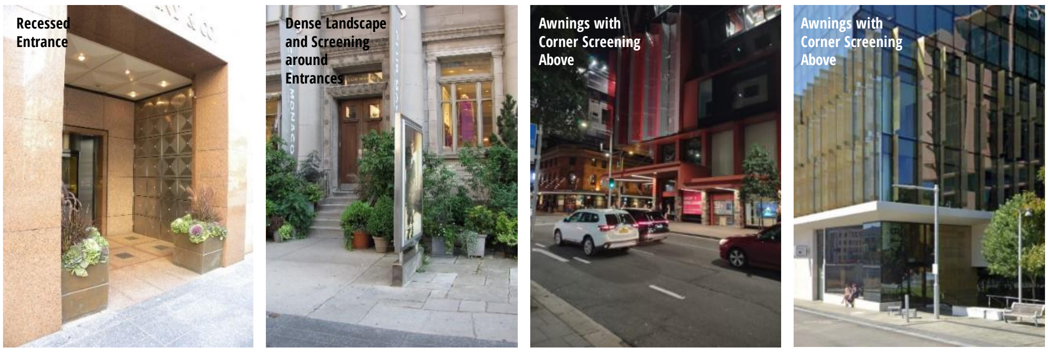

Image 3: Design Examples for Entrances and Corner Profiles

- Vegetation in the form of dense trees with undergrowth can reduce the impact of winds immediately around them and further downwind. These are recommended along Alfred and Little Alfred Streets as well as within internal laneways aligned with these streets. Trees with interlocking canopies are also recommended along the southern boundary of the site along Whaling Road to counter the downwash expected here. Strategic tree placement, e.g., at points where awnings terminate or at corners of the building, can help filter strong winds.
- Any outdoor seating areas on the ground level should correspond to favourable wind locations. Therefore, locating these away from corners on the ground level is recommended. Any planned seating areas should meet the target wind comfort and safety criteria. For instance, spaces where long duration activities are planned (outdoor café seating or dining spaces) should meet the sitting comfort criterion whereas other communal spaces with elective seating should meet at least the standing comfort criterion. Outdoor seating areas can benefit from localised measures such as east-west aligned vegetation or screening to reduce direct wind exposure.
- Any balconies should be located away from the corners and be inset within the planform of the tower. Corner balconies are exposed to wind acceleration effects and, if included, should incorporate vertical screening along one of the open aspects (single aspect design) to ensure comfort / safety of occupants. Setback single aspect balcony designs instead of protruding balcony designs are also beneficial. Impermeable balustrades should be used to provide protection from winds for all balconies (design examples shown in Image 4).

Image 4: Design Examples for Balconies

- Rooftop terraces, if planned, will benefit from 1.5-2 m high impermeable screening and dense landscaping around the perimeter to filter strong winds. Rooftop terraces might also be exposed to winds upwashing off the tower form and reattaching / recirculating within the terraces. Therefore, provisions for localised canopies and setbacks from the building edge should be made to minimise recirculation within the terraces. Examples of typical wind control measures are shown in Image 5.

Image 5: Examples of Wind Control Measures for Podium and Rooftop Amenities

The design advice noted above is broad and conceptual in nature. These aspects should be thoroughly investigated during the initial phases of development, utilising preliminary Computational Fluid Dynamics (CFD) analyses. Any alterations to the tower's structure or integration of mitigation strategies within the site's confines can then be meticulously refined to effectively counter adverse wind patterns. For more comprehensive insights, it is advisable to conduct in-depth examinations employing wind tunnel studies during the later stages of detailed design.

In summary, the existing building likely poses challenges in terms of adverse wind effects around the site, particularly at its southern corners. The proposed addition of four storeys is not expected to have a material impact on these ground level wind conditions. The redevelopment, instead, will provide an opportunity to incorporate various design measures and mitigation elements into the building form that would likely improve the existing wind environment considerably.

Please do not hesitate to contact us if you have any questions.

RWDI

Dr Aman Choudhry
Senior Engineer

Henry Kuo
Project Manager