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SJB Architects

64-70 Hanover Street, Fitzroy

Desktop Wind Impact Analysis

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Executive Summary

SJB Architects commissioned Vipac Engineers and Scientists Ltd to prepare a statement of wind effects for the ground level areas adjacent to the proposed development at **64-70 Hanover Street, Fitzroy.** This appraisal is based on Vipac's experience as a wind-engineering consultancy.

Drawings of the proposed development were provided by **SJB Architects** in **April 2026**.

The findings of this study can be summarized as follows with the proposed design:

- Wind conditions in the ground level footpath areas and access ways would be expected to be within the **walking** comfort criterion.
- The main entrances would be expected to be within the **standing** comfort criterion.
- The outdoor seating area on the ground floor would be expected to be within the **sitting** comfort criterion.
- The internal courtyard would be expected to be within the **standing** comfort criterion.
- The terraces and balconies would be expected to be within the recommended **standing** comfort criterion.
- The rooftop communal terrace is expected to have wind conditions within the recommended **standing** comfort criterion.
- The wind conditions are expected to fulfil safety criterion.

As a general statement, educating occupants about wind conditions at open terrace/balcony areas during high-wind events and fixing loose, lightweight furniture on the terrace is highly recommended.

The assessments provided in this report have been made based on experience of similar situations in Melbourne and around the world. As with any opinion, it is possible that an assessment of wind effects based on experience and without experimental validation may not account for all complex flow scenarios in the vicinity.

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1 Introduction

Vipac Engineers and Scientists has been commissioned by **SJB Architects** to carry out an appraisal of the pedestrian wind effects at the ground level of the proposed development at **64-70 Hanover Street, Fitzroy.**

Strong winds in pedestrian areas are frequently encountered in central business districts of cities around the world, including Sydney, Melbourne, and Brisbane. Wind characteristics such as the mean speed, turbulence and ambient temperature determine the extent of disturbance to users of pedestrian areas. These disturbances can cause both comfort and safety problems and require careful consideration to mitigate successfully.

The proposed development is a 8-storey residential building with a roof height of 28 m from Hanover Street. The site is bounded by Fitzroy Street to the West, Hanover Street to the North, and Brunswick Place to the East and South directions. A satellite image of the proposed development site and the north elevation of the building are shown in Figure 1 and Figure 2, respectively.

This report details the opinion of Vipac as an experienced wind engineering consultancy regarding the wind effects in ground level footpath areas adjacent to the development as proposed. No wind tunnel testing has been carried out for this development at this stage. Vipac has carried out wind tunnel studies on many developments of similar shape and having similar exposure to that of the proposed development. These serve as a valid reference for the prediction of wind effects. Empirical data for typical buildings in boundary layer flows has also been used to estimate the likely wind conditions on the ground level areas of the proposed development [2] & [3].

Drawings of the proposed development were supplied to Vipac by **SJB Architects** in **April 2026**.

A list of drawings supplied is provided in Appendix C of this report.

Figure 1: Aerial view of the proposed development site.

Figure 2: North elevation of the proposed development.

2 Analysis Approach

In assessing whether a proposed development is likely to generate adverse wind conditions in ground level footpath areas, Vipac has considered the following five main points:

- The exposure of the proposed development to wind;
- The regional wind climate;
- The geometry and orientation of the proposed development;
- The interaction of flows with adjacent developments; and
- The assessment criteria determined by the intended use of the areas affected by wind flows generated or augmented by the proposed development.

The pedestrian wind comfort at specific locations of ground level footpath areas may be assessed by predicting the gust and mean wind speeds with a probability of 0.1% and 20% expected at that location. The location may be deemed generally acceptable for its intended use while gust and mean wind speeds are within the threshold values noted in Section 2.5. Where Vipac predicts that a location would not meet its appropriate comfort criterion, the use of wind control devices and/or local building geometry modifications to achieve the desired comfort rating may be recommended. For complex flow scenarios or where predicted flow conditions are well more than the recommended criteria, Vipac recommends scale model wind tunnel testing to determine the type and scope of the wind control measures required to achieve acceptable wind conditions.

2.1 Site Exposure

The proposed development is located on a relatively flat terrain. The site is surrounded within an approximately 1.7 km radius predominately by low to mid-rise developments with high-rise buildings (Melbourne CBD) to the South-West; with Carlton Gardens to West. A satellite image showing these site surroundings is shown in Figure 3.

Considering the immediate surroundings and terrain, for the purposes of this study, the site of the proposed development is assumed to be within Terrain Category 3.5 from WSW to SSW and Terrain Category 3 for all wind directions (Figure 3).

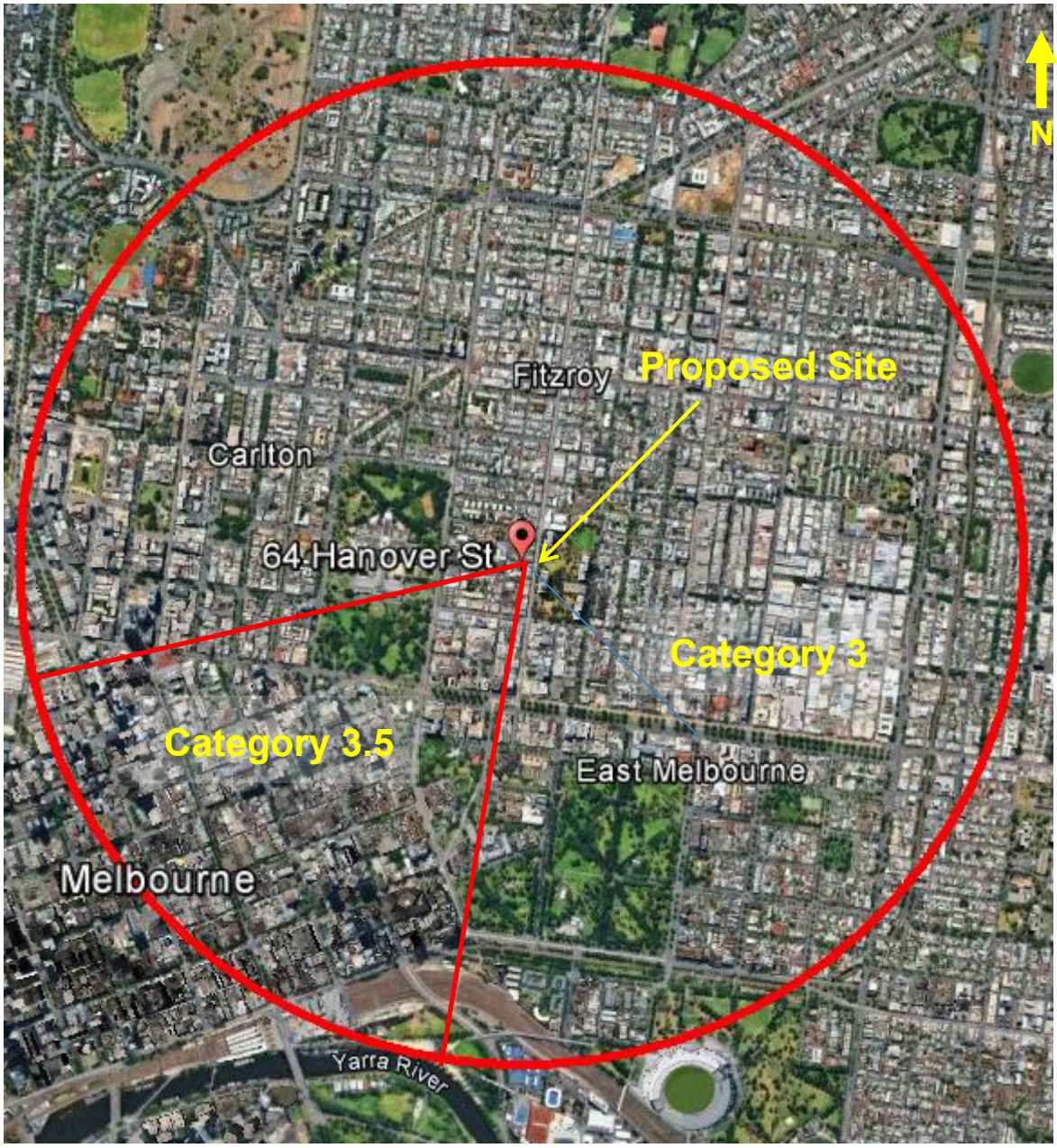


Figure 3: Assumed terrain categories for wind speed estimation.

2.2 Regional Wind Climate

The mean and gust wind speeds have been recorded in the Melbourne area for over 30 years. This data has been analysed and the directional probability distribution of wind speeds has been determined. The directional distribution of hourly mean wind speed at the gradient height, with a probability of 0.1% of time and 20% of time exceeded are shown in Figure 4. The wind data at this free stream height is common to all Melbourne city sites and may be used as a reference to assess ground level wind conditions at the site.

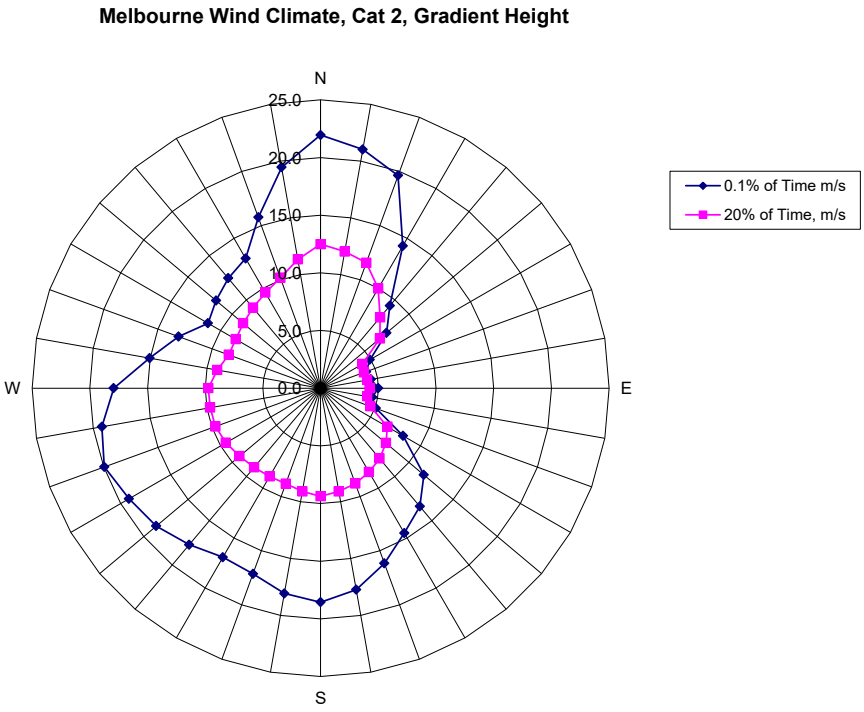


Figure 4: Directional Distribution of Mean Hourly Wind Velocities (m/s) for 0.1% and 20% exceeded at Gradient Height for Melbourne.

2.3 Building Geometry and Orientation

The proposed development is a 8-storey mixed-used building. The overall plan-form dimensions are approximately 55 m x 45 m as shown in Figure 5. The main entrances are located on Hanover Street and Fitzroy Street.

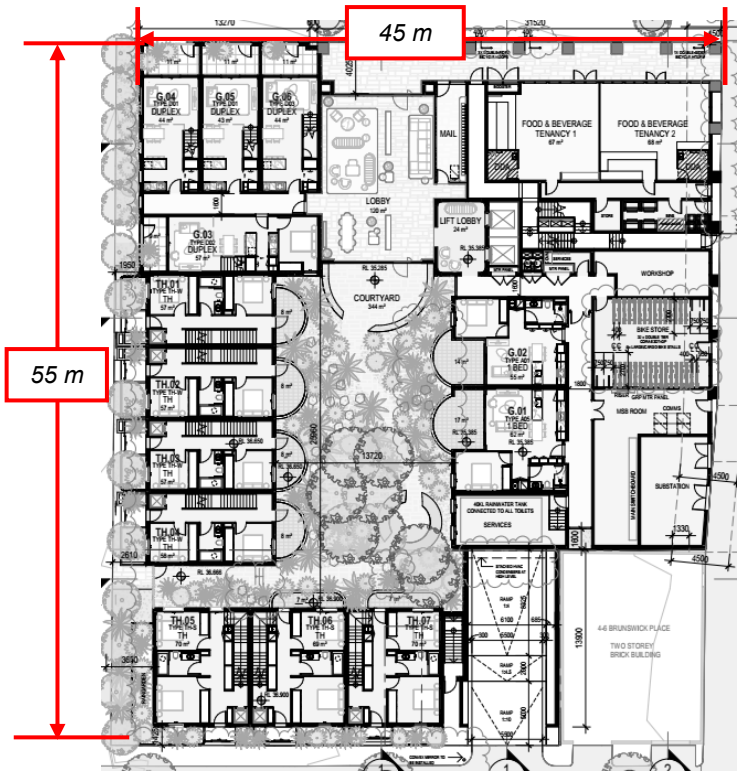


Figure 5: Ground floor plan with the overall dimensions overlaid.

2.4 Flow interactions with Adjacent Developments

The immediately adjacent developments are shown in Figure 6. At ground level, the site is exposed to direct winds from the northerly and westerly directions channelling along Fitzroy and Hanover Street. The building is oriented such that adverse impacts from corner acceleration of westerly and westerly winds is expected at ground level. The development is taller than most of the surrounding buildings and so is exposed to winds from all directions at the upper levels.

Figure 6: Immediately adjacent surroundings and their approximate number of floors (F).

2.5 Assessment Criteria

The following wind comfort criteria detailed in Table 1 were applied in this study.

Table 1: Wind Comfort Criteria as per Clause 58.04-4

Unsafe	Comfortable
Annual maximum 3 second gust wind speed exceeding **20m/sec** with a probability of exceedance of 0.1% considering at least 16 wind directions.	Hourly mean wind speed or gust equivalent mean speed from all wind directions combined with probability of exceedance less than 20% of the time, equal to or less than: **3m/sec** for sitting areas (outdoor cafés) **4m/sec** for standing areas (window shopping, queuing) **5m/sec** for walking areas (steady steps for most pedestrians)

This criterion specifically calls for the safety criterion to be used to assess infrequent winds (e.g. peak event of ≤ 0.1% of the time); and the perceived pedestrian comfort to be assessed based on frequently occurring winds (e.g. winds that occurs 80% of the time).

In Table 1, the mean wind velocity is defined as the maximum of hourly mean or gust equivalent mean (Gust/1.85)

This criterion specifies that safe and comfortable wind conditions must be achieved in publicly accessible areas within a distance equal to half the longest width of the building measured from all facades or half the overall height of the building, whichever is greater, as shown in Figure 7.

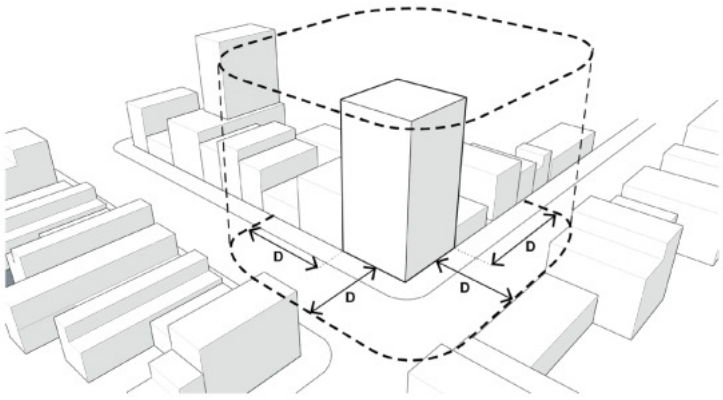


Figure 7: Assessment distance.

2.5.1 Use of Adjacent Pedestrian Occupied Areas & Recommended Comfort Criteria

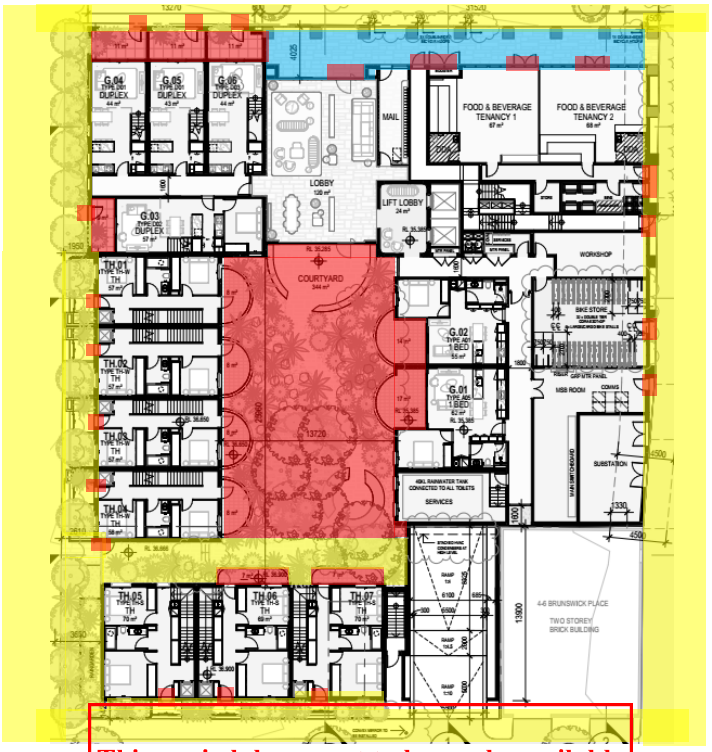
The consideration of the (intended) function of the environment heavily influences the appropriateness of the recommended wind comfort criteria. For example, people frequenting locations such as parks are will likely tolerate a windier environment when compared to people dining at an outdoor café.

This is partly due to the pedestrian's judgement in clothing and predetermined expectation of the wind environment and partly due to the sensitivity of their activities to wind. For example, patrons at outdoor dining areas are highly sensitivity to wind due to the stationary nature of the activity; whereas pedestrians on the public footpaths may maintain a level of comfort under otherwise uncomfortable conditions by partaking in general activities performed on the footpath such as walking.

The following table lists the specific areas adjacent to the proposed development and the corresponding recommended criteria.

Table 2: Recommended application of criteria

Area	Specific location	Recommended Criteria
Public Footpaths, Access ways	Along Fitzroy Street, Hanover Street, and Brunswick Place (Figure 8)	Walking
Building Entrances	Main Building Entrances Along Fitzroy Street, Hanover Street, and Brunswick Place (Figure 8)	Standing
Outdoor Communal Areas	Located on the Rooftop and ground floor internal courtyard (Figure 8 and Figure 9)	Standing
Balcony/Terraces	Up the height of the building	Standing
Courtyard	Ground level (Figure 8)	Standing
Outdoor Seating	Ground level (Figure 8)	Sitting

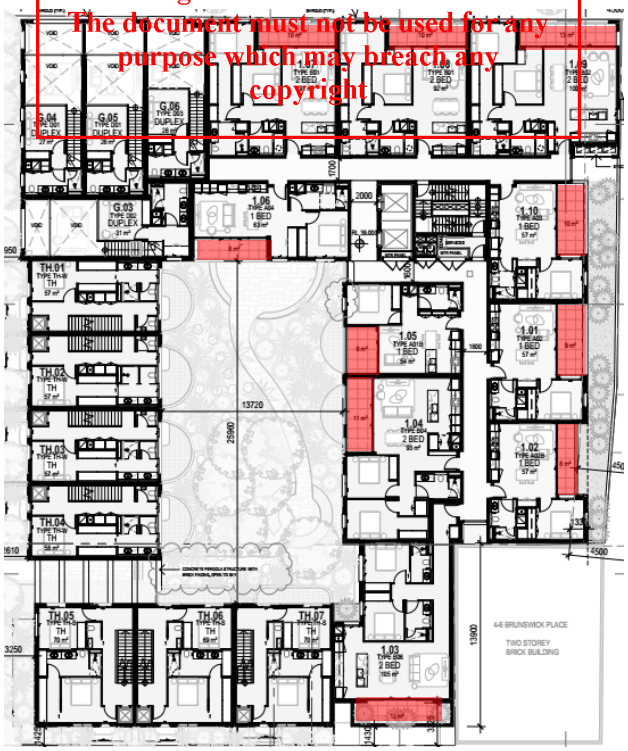


Recommended to fulfil Walking

Recommended to fulfil Standing

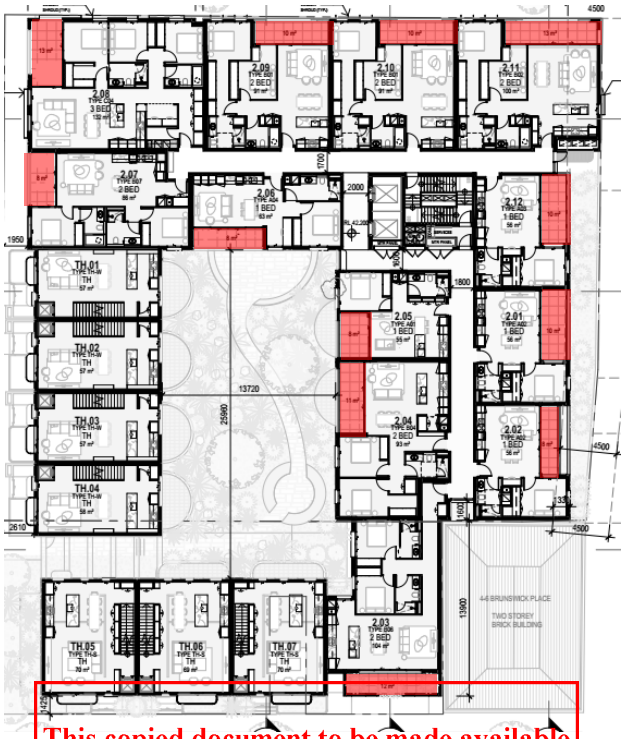
Recommended to fulfil Sitting

Figure 8: Ground floor with recommended wind criteria overlaid.



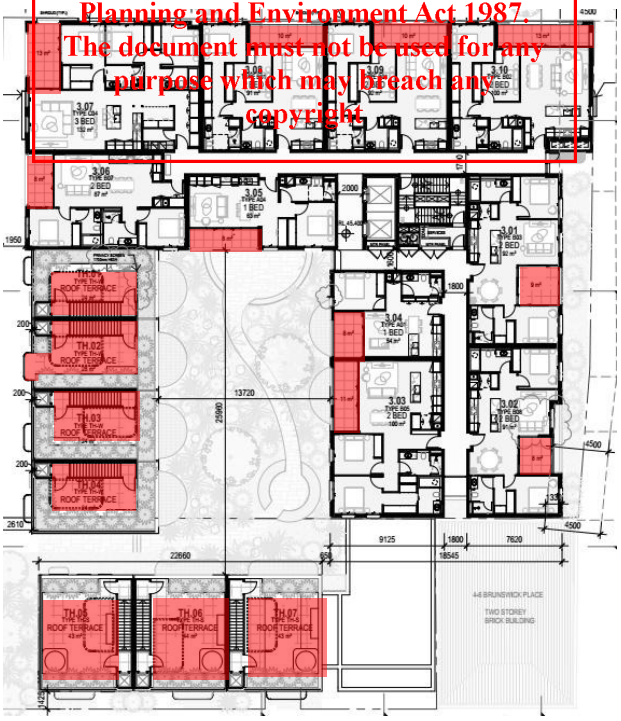
Recommended to fulfil Standing

Figure 9: Level 1 floor plan with recommended wind criteria overlaid.



Recommended to fulfil Standing

Figure 10: Level 2 floor plan with recommended wind criteria overlaid.



Recommended to fulfil Standing

Figure 11: Level 3 floor plan with recommended wind criteria overlaid.

Recommended to fulfil Standing

Figure 12: Level 4 floor plan with recommended wind criteria overlaid.

Recommended to fulfil Standing

Figure 13: Levels 5 & 6 floor plans with recommended wind criteria overlaid.

Figure 14: Level 7 floor plan with recommended wind criteria overlaid.

3 Pedestrian Level Wind Effects

3.1 Discussion

The proposed design has several features that are expected to be beneficial to the pedestrian wind environment. This is inclusive but not limited to the following:

- Tower setback from all directions.
- Landscaping proposed in communal area.

Due to the proposed height above most of the surrounding areas, the proposed development is particularly exposed to adverse southerly, northerly, and westerly winds. High wind levels are expected along Fitzroy and Hanover Streets. The proposed development has a setback tower design from level 3 upwards. These setbacks in combination with tower design are expected to be beneficial to the wind environment on the ground floor; such that the internal courtyard is expected to be within the recommended standing comfort criterion or better.

The main entrances are located along the Fitzroy and Hanover Streets and Brunswick Place. Due to tower setback leading to decrease downwash effects, all entrances are expected to be within the recommended standing comfort criterion.

The proposed seating area on the ground level setback to Hanover Street is well shielded from prevailing winds, therefore, the recommended sitting comfort criteria is expected to be met without additional mitigations.

Private balconies up to level 3 are expected to have windspeeds within the standing comfort criterion. Terraces on level 3 are also expected to have windspeeds within the standing comfort criterion.

The rooftop communal terrace is relatively exposed to northerly-southerly and westerly winds. With the standing comfort criterion is desired, the proposed solid balustrades, with a height of 1.5 m along the outer boundaries, are expected to ameliorate any adverse wind conditions and reach standing comfort criteria. Additionally, the proposed planters are anticipated to further enhance standing comfort within the outdoor amenity area, however, these planters are not required to achieve the standing comfort criterion, they are only supplemental (Figure 15).

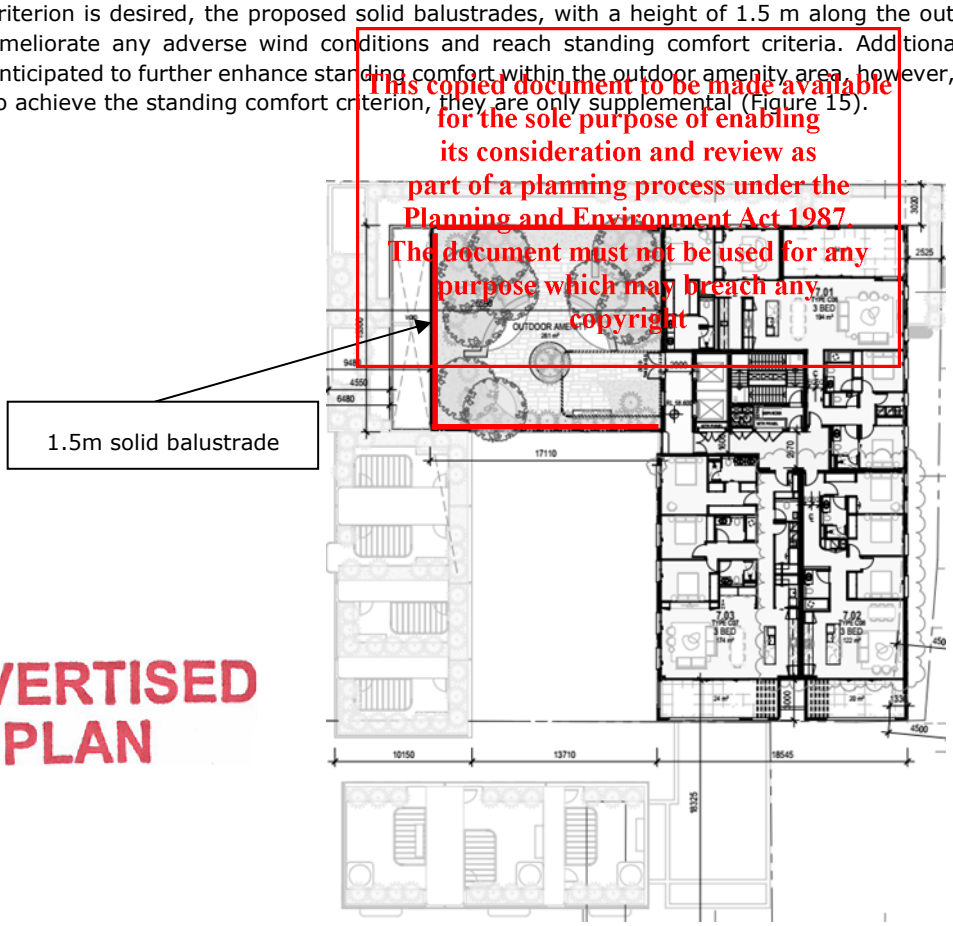


Figure 15: Level 7 floor plan with proposed wind mitigation.

The wind conditions are expected to fulfil safety criterion.

It should be noted that this study is based on experience only and has not utilised any simulation or experimental data for the analysis.

4 Conclusions

An appraisal of the likely wind conditions at the pedestrian ground level and balcony areas of the proposed development at **64-70 Hanover Street, Fitzroy** has been made.

Vipac has carefully considered the form and exposure of the proposed development, nominated criteria for various public areas according to their function and referred to past experience to produce our opinion of likely wind conditions.

The findings of this study can be summarized as follows with the proposed design:

- Wind conditions in the ground level footpath areas and access ways would be expected to be within the **walking** comfort criterion.
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This Report has been Prepared

For

SJB Architects

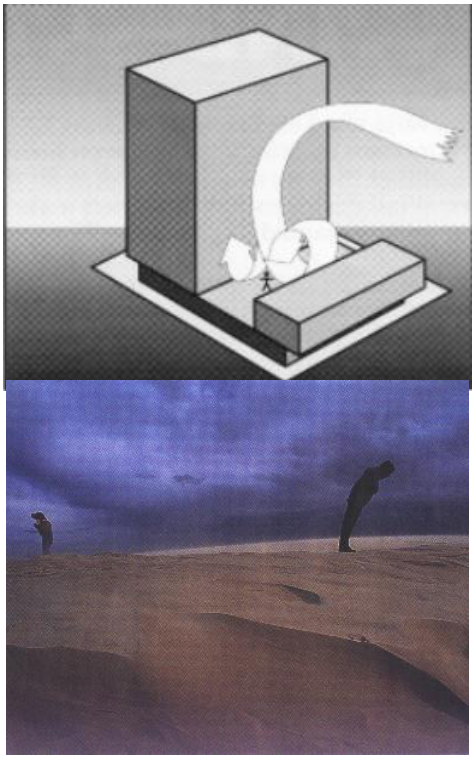
By

VIPAC ENGINEERS & SCIENTISTS PTY LTD.

Appendix A Environmental Wind Effects

Atmospheric Boundary Layer

As wind flows over the earth it encounters various roughness elements and terrain such as water, forests, houses and buildings. To varying degrees, these elements reduce the mean wind speed at low elevations and increase air turbulence. The wind above these obstructions travels with unattenuated velocity, driven by atmospheric pressure gradients. The resultant increase in wind speed with height above ground is known as a wind velocity profile. When this wind profile encounters a tall building, some of the fast-moving wind at upper elevations is diverted down to ground level resulting in local adverse wind effects.



The terminology used to describe the wind flow patterns around the proposed development is based on the aerodynamic mechanism, direction and nature of the wind flow.

Downwash – refers to a flow of air down the exposed face of a tower. A tall tower can deflect a fast-moving wind at higher elevations downwards.

Corner Accelerations – when wind flows around the corner of a building it tends to accelerate in a similar manner to airflow over the top of an aeroplane wing.

Flow separation – when wind flowing along a surface suddenly detaches from that surface and the resultant energy dissipation produces increased turbulence in the flow. Flow separation at a building corner or at a solid screen can result in gusty conditions.

Flow channelling – the well-known "street canyon" effect occurs when a large volume of air is funnelled through a constricted pathway. To maintain flow continuity the wind must speed up as it passes through the constriction. Examples of this might occur between two towers, in a narrowing street or under a bridge.

Direct Exposure – a location with little upstream shielding for a wind direction of interest. The location will be exposed to the unabated mean wind and gust velocity. Piers and open water frontage may have such exposure.

Appendix B References

[1] *Structural Design Actions, Part 2: Wind Actions*, Australian/New Zealand Standard 1170.2:2011

[2] *Wind Effects on Structures* E. Simiu, R Scanlan, Publisher: Wiley-Interscience

[3] *Architectural Aerodynamics* R. Aynsley, W. Melbourne, B. Vickery, Publisher: Applied Science Publishers

[4] *The Aerodynamic Characteristics of Windbreaks, Resulting in Empirical Design Rules* J. Gandemer, Publisher: *Journal of Wind Engineering and Industrial Aerodynamics*

[6] *Wind Protection by Model Fences in a simulated Atmospheric Boundary Layer* J.K. Rain, D.C. Stevenson, Publisher: *Journal of Industrial Aerodynamics, 2*

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[8] *Wind Design Guide* J. Bennett Publisher: *BBSC 433 – Architectural Aerodynamics*

[9] *Central City Built Form Review: Wind Assessments*, Global Wind Technology Services

[10] *Wind Guidelines for Planning Applicants* H. Fricke Publisher: *Moonee Valley City Council*

Appendix C Drawings List

Drawings Received: **April 2026**

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