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HHP MAKE NRM 1 PTY LTD

467 Neerim Road, Murrumbeena

Wind Impact Assessment



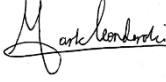


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Executive Summary

HHP MAKE NRM 1 PTY LTD commissioned Vipac Engineers and Scientists Ltd to prepare a statement of wind effects for the ground level areas adjacent to the proposed development at **467 Neerim Road, Murrumbena**. This appraisal is based on Vipac's experience as a wind-engineering consultancy.

Updated drawings of the proposed development were provided by **Fieldwork** in **April 2026**. The findings of this study, with the proposed design, can be summarized as follows:

- 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 seating areas would be expected to be within the **sitting** comfort criterion.
- The communal terraces would be expected to be within the **standing** comfort criterion; some more sheltered areas are expected to achieve the most stringent sitting comfort criterion.
- The private balconies would be expected to be within the recommended **walking** comfort criterion.
- The wind conditions would be expected to fulfil the **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 are 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 **HHP MAKE NRM 1 PTY LTD** to carry out an appraisal of the pedestrian wind effects at the ground level of the proposed development at **467 Neerim Road, Murrumbena**, being allotment 2012 East of Elsterwick, Parish of Prahran.

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 an 8-storey residential building with an approximate roof height of 29.5m. The site is bounded by Neerim Road to the northeast, Murrumbena Station, and Railway Parade to the southwest, a pedestrian pathway to the southeast and existing buildings to the northwest. A satellite image of the proposed development site and 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].

Updated drawings of the proposed development were supplied to Vipac by **Fieldwork** 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.

2.1 Site Exposure

The proposed development is located on relatively flat terrain. The site is surrounded within an approximately 1.5 km radius predominately by low to mid-rise developments. 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 for all wind directions (Figure 3).

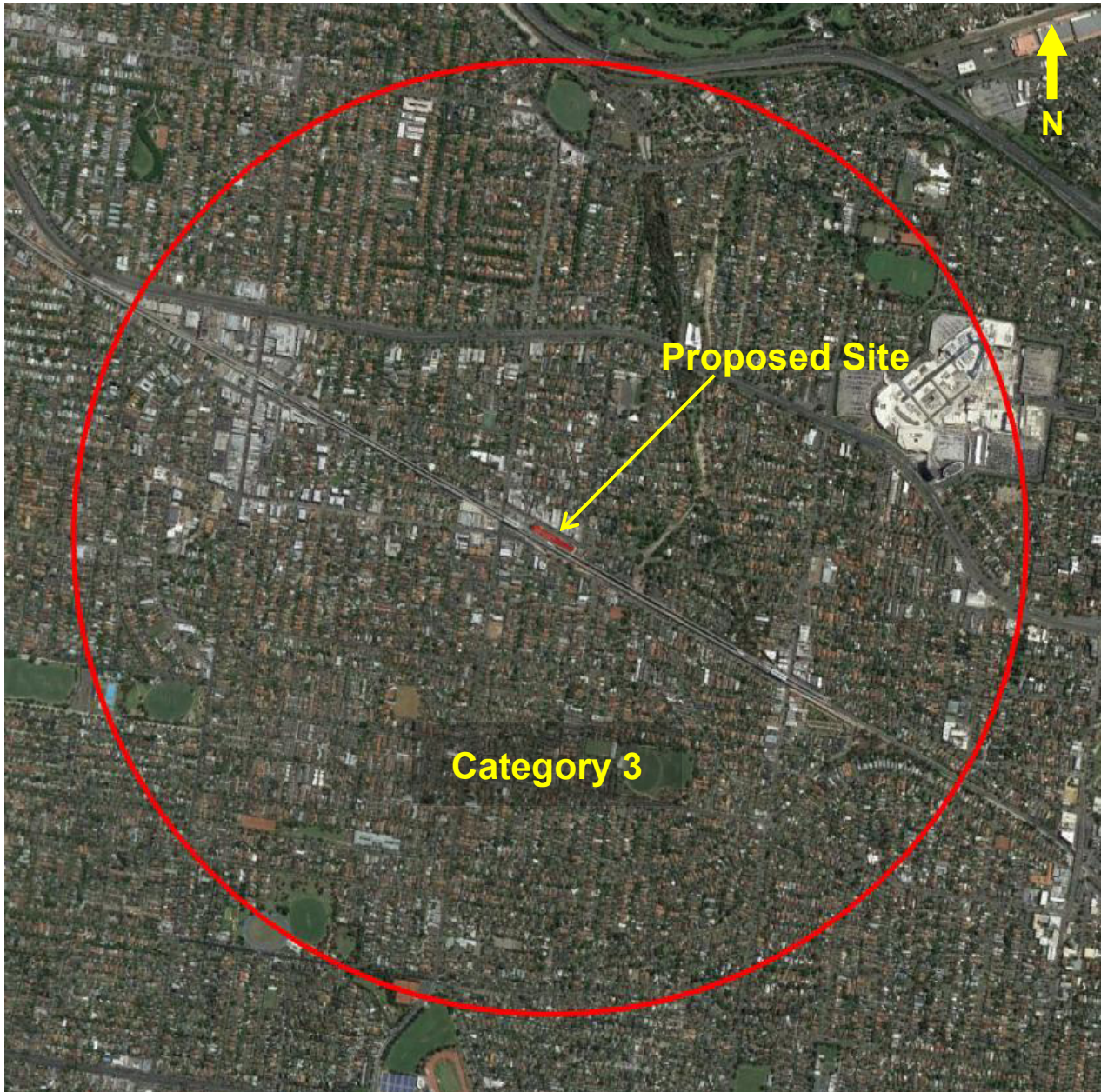


Figure 3: Assumed terrain categories for wind speed estimation.

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.

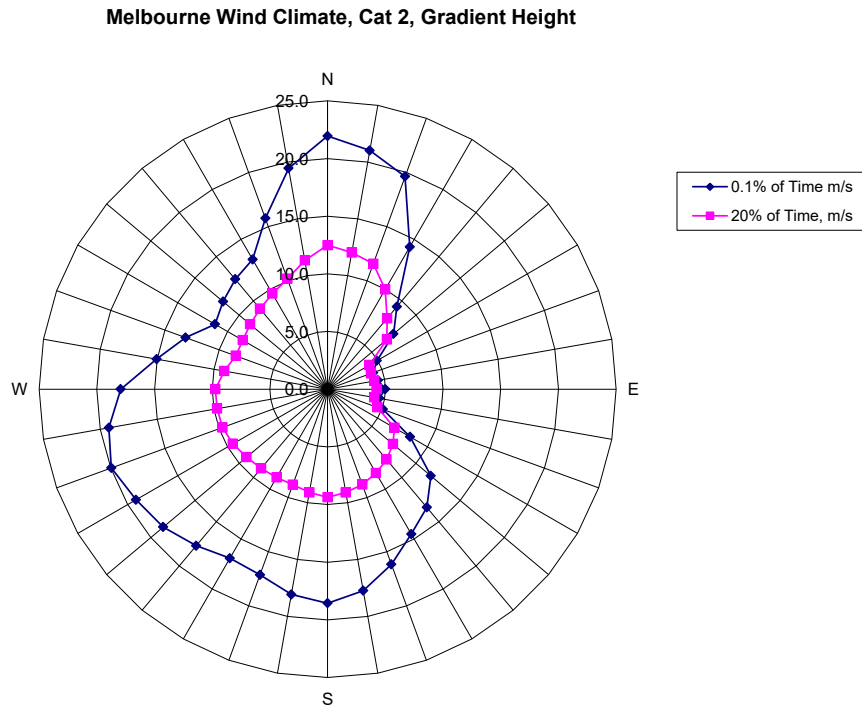


Figure 4: Directional Distribution of Mean Hourly Wind Velocities (m/s) for 0.1% and 20% exceeded at Gradient Height for Melbourne.

2.3 Building Geometry and Orientation

The proposed development is an 8-storey residential building. The overall plan-form dimensions are approximately 17 m x 142 m as shown in Figure 5. The main entrances are located on at the eastern corner and off Neerim Road to the western side of the development. The development incorporates a rooftop communal amenity area.

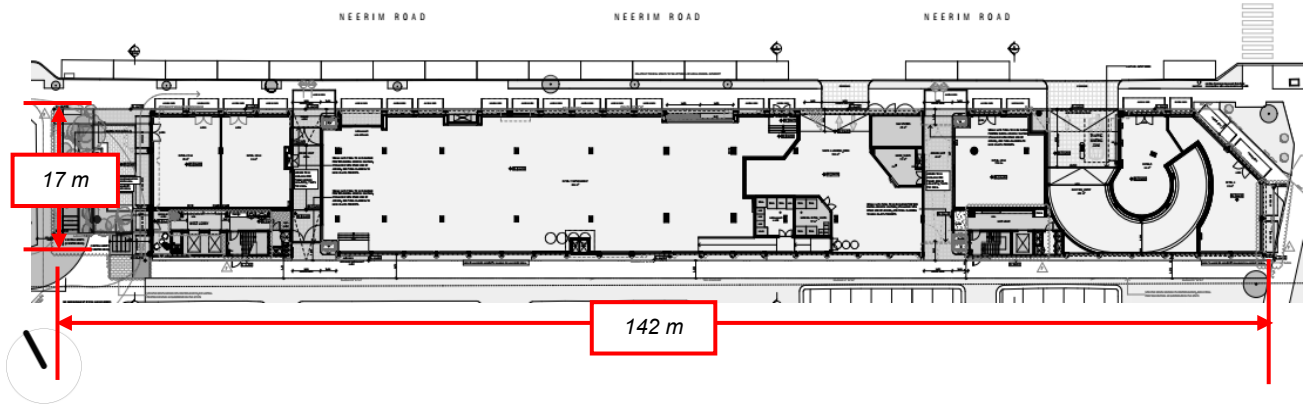


Figure 5: Ground floor plan with the overall dimensions overlaid.

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 north-westerly direction channelling along Neerim Road. The building is oriented such that adverse impacts from corner acceleration of northerly winds is expected at ground level. The development is taller than the surrounding buildings and so is exposed to winds from all directions at the upper levels, which would result in downwash winds to the adjacent ground level footpaths.



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.

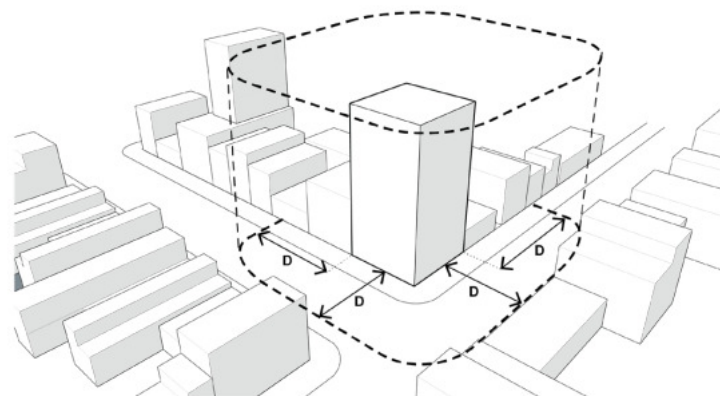
Table 1: Wind Comfort Criteria as per Clause 58.04-4

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 $\leq 0.1\%$ 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.



**ASSESSMENT DISTANCE D = GREATER OF:
L/2 (HALF LONGEST WIDTH OF BUILDING) OR
H/2 (HALF OVERALL HEIGHT OF BUILDING)**

Figure 7: Assessment distance.

2.5.1 Use of Adjacent Pedestrian Occupied Areas & Recommended Comfort Criteria

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 Neerim Road, the adjacent laneway and park (Figure 8)	Walking
Building Entrances	Main building entrances throughout site (Figure 8)	Standing
Outdoor Seating Area	West of site (Figure 8)	Sitting
Outdoor Communal Areas	Level 5 and Level 7 (Figure 11 & 13)	Standing
Balcony/Terraces	Up the height of the building	Walking (See discussion below)

2.5.2 Terrace / Balcony Recommended Criterion Discussion

There are Private Balconies and Terraces located up the height of the development. Vipac recommends as a minimum that balcony/terrace areas meet the criterion for walking since:

- these areas are not public spaces;
- the use of these areas is optional, and only intended to be used on fair weather days with calm winds;
- many similar developments in Melbourne and other Australian capital cities experience wind conditions on balconies and elevated deck areas in the vicinity of the criterion for walking.

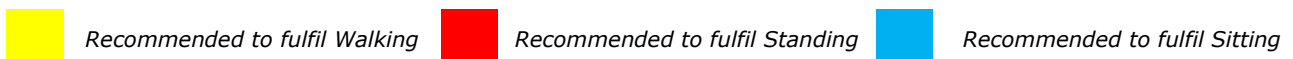
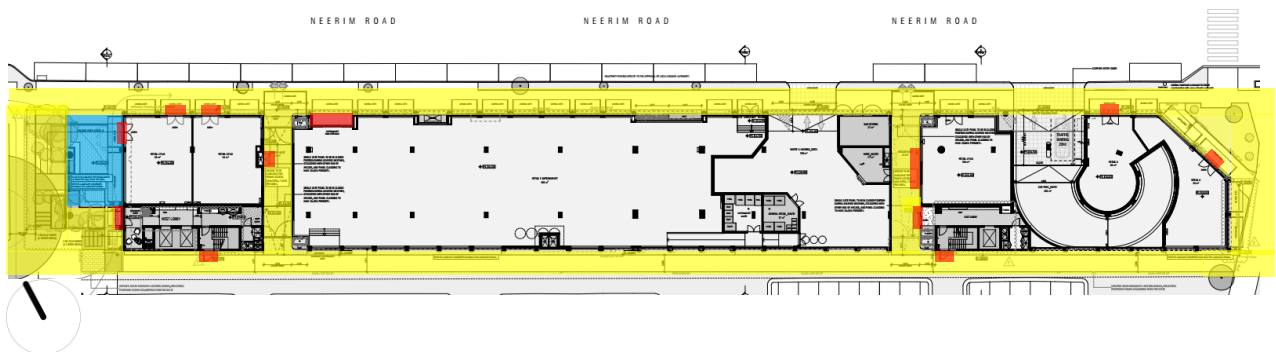
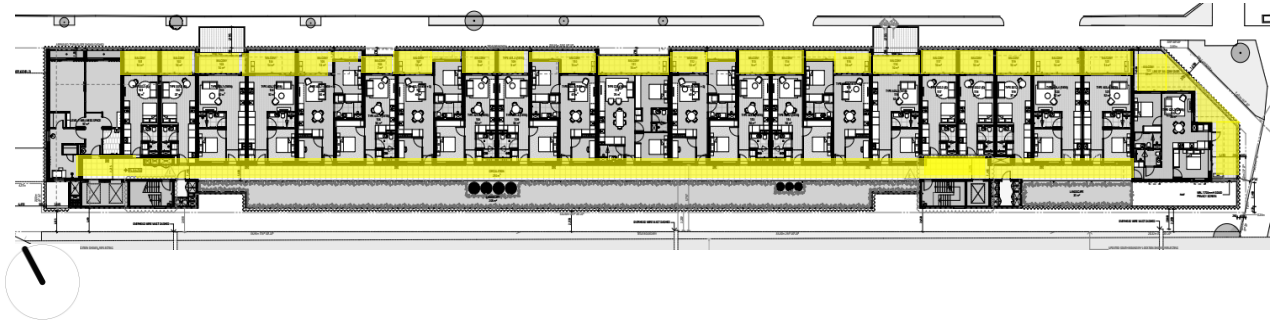


Figure 8: Ground floor plan with recommended wind criteria overlaid.




 Recommended to fulfil Walking

Figure 9: First floor plan with recommended wind criteria overlaid.




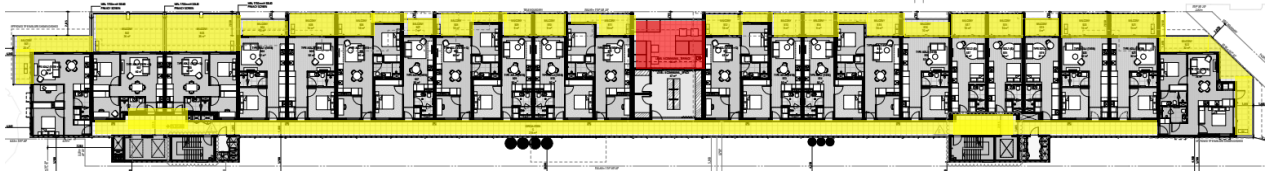
 Recommended to fulfil Walking

Figure 10: Second to Fourth floor plan with recommended wind criteria overlaid.



 Recommended to fulfil Walking  Recommended to fulfil Standing

Figure 11: Fifth floor plan with recommended wind criteria overlaid.

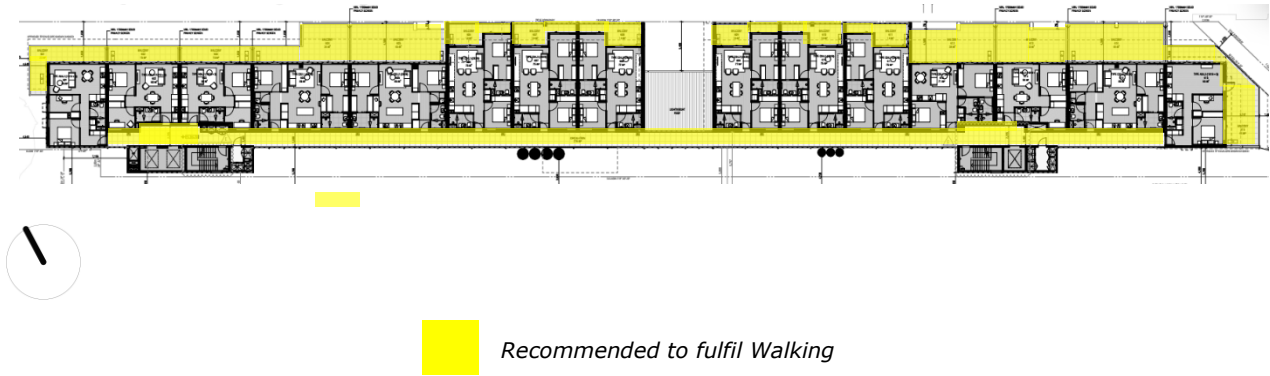


Figure 12: Sixth floor plan with recommended wind criteria overlaid.



Figure 13: Seventh floor plan with recommended wind criteria overlaid.

3 Pedestrian Level Wind Effects

3.1 Discussion & Recommendations

The proposed development is significantly higher than its surrounding area; such that it is expected to collect uninterrupted prevailing northerly winds that may cause adverse wind conditions at ground level. However, the proposed development incorporates chamfered corners and canopies along Neerim Road that are expected to reduce the impacts of downwash and corner acceleration winds. Considering these features, as well as the tower setback design, it is expected the wind levels in the pedestrian footpaths surrounding the development would be within the recommended walking comfort criterion.

Building entrances are located away from corners, beneath the canopy and setback by the proposed colonnades. The entrances within Arcade East and Arcade West are expected to experience elevated wind levels due to channelling effects. However, the design features security gates with 20-30% porosity cladding that can be deployed in a staggered arrangement on both ends on adverse weather days. This is expected to be beneficial to the wind environment, such that wind speeds are expected to be within the recommended standing comfort criterion at all entrances.

There are private balconies located on the eastern and northern facades of the development up the height of the building. The balconies are generally inset within the building façade and would be expected to have an acceptable wind environment with the proposed design.

The under-croft to the west is expected to accelerate winds, however, they are not expected to be more than the recommended walking comfort criterion. This area has several design features that are expected to be beneficial to the wind environment. This is inclusive of the following:

- Colonnades
- Awnings
- Planter boxes of height 0.8-1.2m
- Landscaping.

After further qualitative analysis, with the design features listed above; wind speeds are expected to be within the recommended sitting criterion for these locations. This wind comfort is attributed to the above listed features that act as a barrier against gust winds and mitigate wind speed from adjacent structures. In other words, the integration of landscaped buffers, colonnades, and strategically positioned awnings helps to diffuse prevailing winds, reduce wind acceleration at pedestrian level, and minimize corner effects. Additionally, the orientation and massing of Murrumbena Station contributes to breaking up wind corridors, preventing the formation of uncomfortable wind effects.

The communal terrace on Level 5 features full-height solid screens adjacent to the walkway and 1m high balustrades along the perimeter (bottom portion solid, top portion porous). These are expected to ameliorate any adverse channelling winds between the building massing. As such, wind speeds are expected to be within the recommended standing comfort criterion.

The communal terrace on Level 7 is above the shielding influence of the surrounding developments. The terrace is relatively exposed to the prevailing northerly and south westerly winds. The proposed 1.2m high solid balustrades and, the roof above is generally expected to be beneficial to the wind environment. Considering these elements, the wind speeds are expected to be within the recommended standing comfort 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 proposed development is expected to generate winds within safety criterion.

4 Conclusions

An appraisal of the likely wind conditions at the pedestrian ground level, communal terrace, and balcony areas of the proposed development at **467 Neerim Road, Murrumbena** 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, with the proposed design, can be summarized as follows:

- 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 seating areas would be expected to be within the **sitting** comfort criterion.
- The communal terraces would be expected to be within the **standing** comfort criterion; some more sheltered areas are expected to achieve the most stringent sitting comfort criterion.
- The private balconies would be expected to be within the recommended **walking** comfort criterion.
- The wind conditions would be expected to fulfil the **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.

This Report has been Prepared

For

HHP MAKE NRM 1 PTY LTD

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.

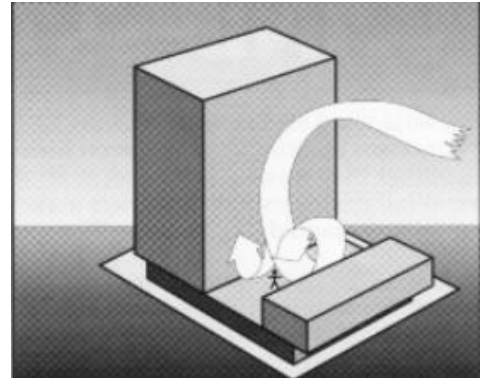
Downwash – refers to a flow of air down the exposed face of a tower. A tall tower can deflect a fast-moving wind at higher elevations downwards.

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 1170.2:2021
- [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

Appendix C Drawings List

FIELDWORK architectural drawings received:

April 2026

DRAWING NUMBER	DRAWING NAME	REV
TP000	COVER SHEET	F
TP001	DEVELOPMENT SCHEDULE	D
TP100	EXISTING SITE PLAN	D
TP101	PROPOSED SITE PLAN	E
TP110	DEMOLITION PLAN	D
TP210	BASEMENT 02 FLOOR PLAN	F
TP2101	BASEMENT 01 FLOOR PLAN	F
TP2102	GROUND FLOORPLAN	F
TP2103	LEVEL 01 FLOOR PLAN	E
TP2104	LEVEL 02 FLOOR PLAN	E
TP2105	LEVEL 03 FLOOR PLAN	E
TP2106	LEVEL 04 FLOOR PLAN	E
TP2107	LEVEL 05 FLOOR PLAN	E
TP2108	LEVEL 06 FLOOR PLAN	E
TP2109	LEVEL 07 FLOOR PLAN	E
TP2110	ROOF FLOOR PLAN	E
TP300	GA ELEVATION 01 NORTH	E
TP3001	GA ELEVATION 02 SOUTH	E
TP3002	GA ELEVATION 03 EAST & WEST	E
TP310	GA SECTION A	D
TP3101	GA SECTION B-D	E
TP7001	ADG COMPLIANCE SCHEDULE 01	D
TP7002	ADG COMPLIANCE SCHEDULE 02	D
TP7003	ADG COMPLIANCE SCHEDULE 03	A
TP7004	ADG COMPLIANCE SCHEDULE 04	A
TP7501	LEVEL 01 & LEVEL 02 - BREEZE PATH AND BALCONY COMPLIANCE PLAN	D
TP7502	LEVEL 03 & LEVEL 04 - BREEZE PATH AND BALCONY COMPLIANCE PLAN	D
TP7503	LEVEL 05 & LEVEL 06 - BREEZE PATH AND BALCONY COMPLIANCE PLAN	D
TP7504	LEVEL 07 - BREEZE PATH AND BALCONY COMPLIANCE PLAN	D
TP800	TYPICAL APARTMENT PLANS - STUDIO_01	B
TP8010	TYPICAL APARTMENT PLANS - 1B1B_01	D
TP8020	TYPICAL APARTMENT PLANS - 1B1B_02	D
TP8030	TYPICAL APARTMENT PLANS - 2B2B_01	D
TP8031	TYPICAL APARTMENT PLANS - 2B2B_02	C
TP900	SHADOW DIAGRAM 9AM 22 SEP	E
TP9001	SHADOW DIAGRAM 10AM 22 SEP	E
TP9002	SHADOW DIAGRAM 11AM 22 SEP	E
TP9003	SHADOW DIAGRAM 12PM 22 SEP	E
TP9004	SHADOW DIAGRAM 1PM 22 SEP	E
TP9005	SHADOW DIAGRAM 2PM 22 SEP	E
TP9006	SHADOW DIAGRAM 3PM 22 SEP	E
TP9015	SOLAR ACCESS TO L7 (WEST) COMMUNAL TERRACE - 21/06	A