

# 5-9 COWAN ROAD

ST IVES, NSW

PEDESTRIAN WIND ASSESSMENT

PROJECT # 2512407

26 AUGUST 2025



## SUBMITTED TO

**Prosper 5-9 Cowan Road  
St Ives Pty Ltd**  
Level 9, 100 William Street  
Woolloomooloo NSW 2011

## SUBMITTED BY

**RWDI Australia Pty Ltd**  
Suite 602, Level 6, 80 William Street,  
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ABN 86 641 303 871

| Version  | Status                                                                                                               | Date           | Prepared By | Reviewed By |
|----------|----------------------------------------------------------------------------------------------------------------------|----------------|-------------|-------------|
| <b>A</b> | Report                                                                                                               | 6 August 2025  | AMC         | JGG         |
| <b>B</b> | Final Report                                                                                                         | 18 August 2025 | AMC         | JGG         |
| <b>C</b> | Report Update based on Final SSDA Drawings (received on 25 August 2025)<br>and inclusion of standard consultant text | 26 August 2025 | AMC         | JGG         |

## NOTE

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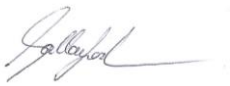
## QUALITY ASSURANCE

RWDI Australia Pty Ltd operates a Quality Management System which complies with the requirements of AS/NZS ISO 9001:2015. This management system has been externally certified by SAI Global and Licence No. QEC 13457 has been issued for the following scope: The provision of consultancy services in acoustic engineering, air quality and wind engineering; and the sale, service, support and installation of acoustic monitoring and related systems and technologies.



# CONSULTANT DECLARATION



| Project Details                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PROJECT NAME</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Application number                          | SSD-88948458                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Project Name                                | Residential flat building with in-fill affordable housing at 5-9 Cowan Road, St Ives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Location                                    | SP30097 within Ku-ring-gai                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Applicant name                              | Prosper 5-9 Cowan Road St Ives Pty Limited                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Applicant address                           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>REPORT DETAILS</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Name of report this declaration relates     | 5-9 Cowan Road Pedestrian Wind Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Report reference no.                        | 2512407                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Report date                                 | 26 August 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Company name (inc. ABN / ACN)               | RWDI Australia Pty Ltd (RWDI) - ABN 86 641 303 871 ACN 641 303 871                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Author name and qualifications              | Dr Aman Choudhry, PHD, MIEAUST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Author address                              | Suite 602, Level 6, 80 William Street, Woolloomooloo, NSW 2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>DECLARATION BY CONSULTANT / REVIEWER</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Name                                        | Joseph Gallace                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Declaration                                 | The undersigned declares that Pedestrian Wind Assessment has been prepared in accordance with the relevant policy, guidelines, or legislative requirements; contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the Pedestrian Wind Assessment relates; does not contain information that is false or misleading; identifies and addresses the relevant Planning Secretary's environmental assessment requirements (SEARs) for the project; identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments to which the Pedestrian Wind Assessment relates; contains a consolidated summary of the proposed or necessary mitigation measures. |
| Signature                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Date                                        | 26 August 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

# EXECUTIVE SUMMARY



This Pedestrian Wind Assessment has been prepared by RWDI Australia Pty Ltd (RWDI) to accompany a detailed State Significant Development Application (SSDA) for a residential development (including in-fill affordable housing) at 5-9 Cowan Road, St Ives within the Ku-ring-gai Local Government Area (LGA).

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-88948458) on 25 July 2025.

This report concludes that the proposed mixed-use development is suitable and warrants approval subject to the implementation of the following mitigation measures.

- Inclusion of densely foliating vegetation or a wind screen with a height of at least 1.5m along the perimeter of Level 7 Communal Terrace and inclusion of the central planters within the terraces.
- Inclusion of 1.8m tall 50% porous screens along the shorter aspects of corner terraces on Level 8.

Following the implementation of the above mitigation measures, the remaining impacts are considered appropriate.

# 1. INTRODUCTION



The SSD application seeks development consent for a proposed residential flat building, including in-fill affordable housing at 5-9 Cowan Road, St Ives (the site). The proposed works include demolition of existing structures, site preparation works, excavation and construction of the building and associated landscaping works.

Specifically, the SSDA seeks development consent for:

- demolition of the existing row of 10 attached townhouses at the site;
- construction of a 9-storey residential flat building comprising:
  - 74 new dwellings (62 market residential units and 12 affordable housing units)
  - 3 basement levels for car parking
  - Communal open space at Ground Level and Level 7
- landscaping; and
- associated site works.

The proposal also incorporates 15% of the total gross floor area for affordable housing and seeks to utilise the incentive controls under Chapter 2, Part 2, Division 1, Section 16 of State Environmental Planning Policy (Housing) 2021 (Housing SEPP) to achieve 30% additional building height and 30% additional floor space ratio (FSR).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 25 July 2025 and issued for the SSDA (SSD-88948458). Specifically, this report has been prepared to respond to the SEARs requirement issued below.

**Table 1: SEARs Requirements**

| SEARs Request                                                                                                                                                                                                                                                                                                                                                                               | Response / Location in Report |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>7. Environment Amenity</b> <ul style="list-style-type: none"><li>• Assess amenity impacts on the surrounding locality, including solar access, visual privacy, view loss and view sharing, as well as <b>wind</b>, lighting and reflectivity impacts. A high level of environmental amenity for any surrounding residential or other sensitive land uses must be demonstrated.</li></ul> | Section 5                     |

# 1. INTRODUCTION



## 1.1 Subject Site

The site is located at 5-9 Cowan Road, St Ives, within the Ku-ring-gai Local Government Area, and is legally described as SP30097. The site has an area of approximately 3,467.7sqm and is rectangular in shape.

The site currently contains a single row of ten, two-storey attached townhouses. The site is defined by large mature trees along the northern, eastern and western boundaries. Vehicular access to the site is provided at the southern boundary of the site from Cowan Road. The site is relatively flat.

The site adjoins St Ives Shopping Village to the north and east. Existing residential development (No. 3 Cowan Road) and St Ives Christ Church border the site to the south. To the west, two storey detached houses are located along Cowan Road.

Refer to Image 1a for site location.

## 1.2 Surrounding Context

The site is located 800-metres east of Cowan Creek which is separated from the site by Pymble Golf Club. The site is also located within 105-metres of Emerald Fitness Centre, 245-metres from St Ives Village Green, and 210-metres from St Ives Playground. The building heights in the immediate locality are generally single to two-storeys, with increased heights of up to 5-storeys on Mona Vale Road, opposite St Ives Christ Church.

The site is accessible via bus services with stops located along Mona Vale Road which is a 4-minute walk to the south, and along Killeaton Street, which is a 9-minute walk to the north. The bus routes connect the site to Mona Vale, Gordon, and the Northern Suburbs.

Refer to Image 1b for the broader surrounding context.

# 1. INTRODUCTION

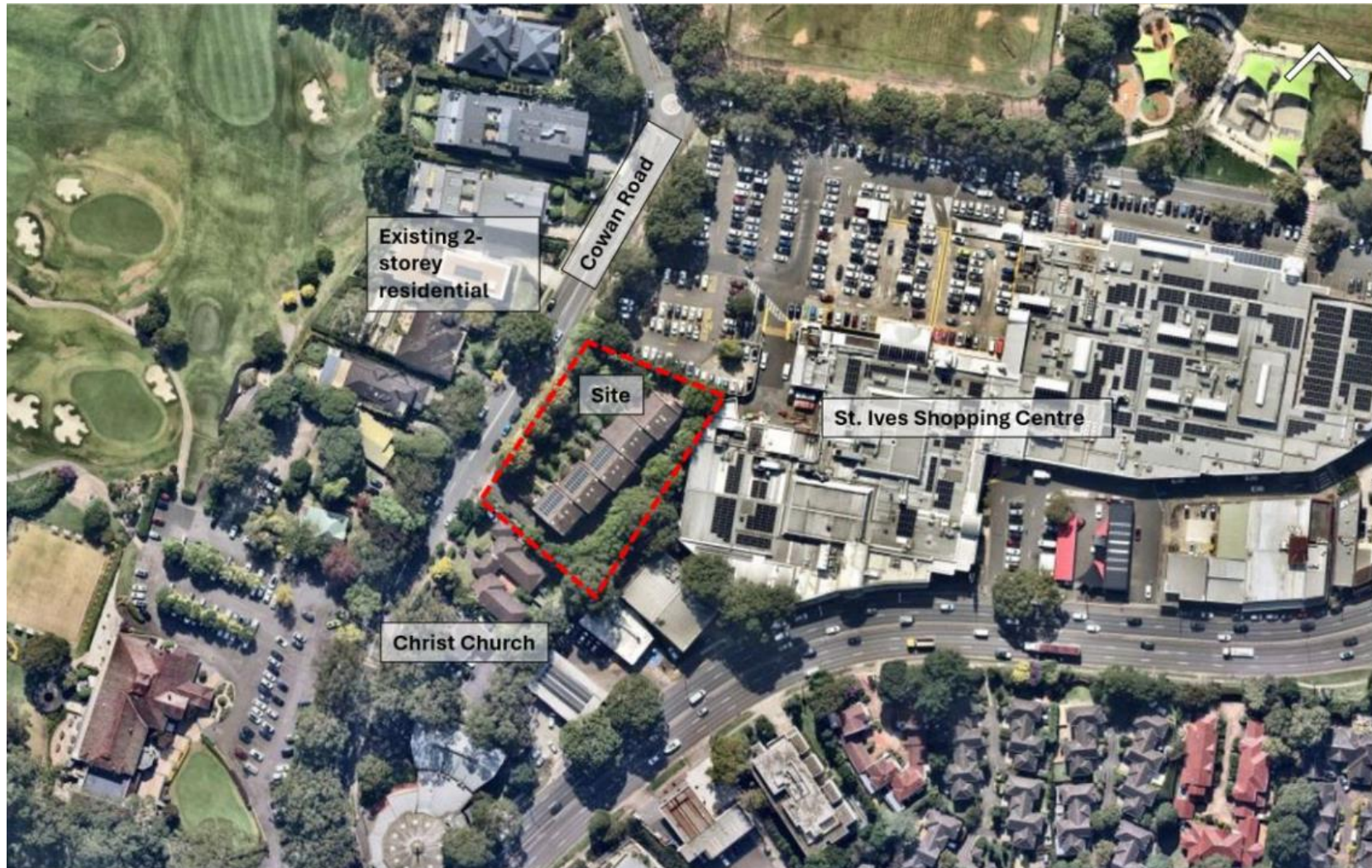


Image 1a: Site Location (Source: Nearmap 2025)

# 1. INTRODUCTION



Image 1b: Broader Site Context (Base source: Nearmap)

# 1. INTRODUCTION



## 1.3 Proposed Development

The Proposed Development comprises an 9-storey residential flat building with 74 new apartments and includes communal open spaces on the Ground Level and on Level 7.

Image 2 shows a 3D render of the Development.



**Image 2: Project Render**

## 2. METHODOLOGY



Predicting wind speeds and occurrence frequencies around a building is a complex process, encompassing an assessment of factors such as building geometry, orientation, surrounding building heights and positions, terrain upstream, and the local wind climate. RWDI has amassed extensive expertise through conducting numerous wind tunnel studies and Computational Fluid Dynamics (CFD) assessments specifically focused on pedestrian wind conditions around buildings. This wealth of experience, complemented by comprehensive literature, facilitates a reliable and efficient desktop estimation of pedestrian wind conditions for concept designs without the need for wind-tunnel testing or detailed CFD studies.

Note that this approach delivers a preliminary assessment of potential wind conditions around the site. It offers a conceptual framework for wind control measures aimed at enhancing wind comfort, if and where necessary. To further validate and refine the predicted conditions discussed in this report or to fine-tune the suggested wind control measures, physical scale model tests in a boundary layer wind tunnel or CFD simulations will be required. These detailed studies offer a quantitative validation and enable a more detailed assessment, ensuring the accuracy and effectiveness of proposed wind control strategies.

Therefore, RWDI's assessment is based on the following:

- A review of the regional long-term meteorological data;
- Drawings and information received by RWDI in August 2025.
- Wind-tunnel studies, CFD simulations, and desktop assessments undertaken by the microclimate team for projects in the region;
- RWDI's engineering judgement, experience, and expert knowledge of wind flows around buildings<sup>1, 2</sup>; and,
- Assessment against a suitable criteria for pedestrian wind comfort and safety.

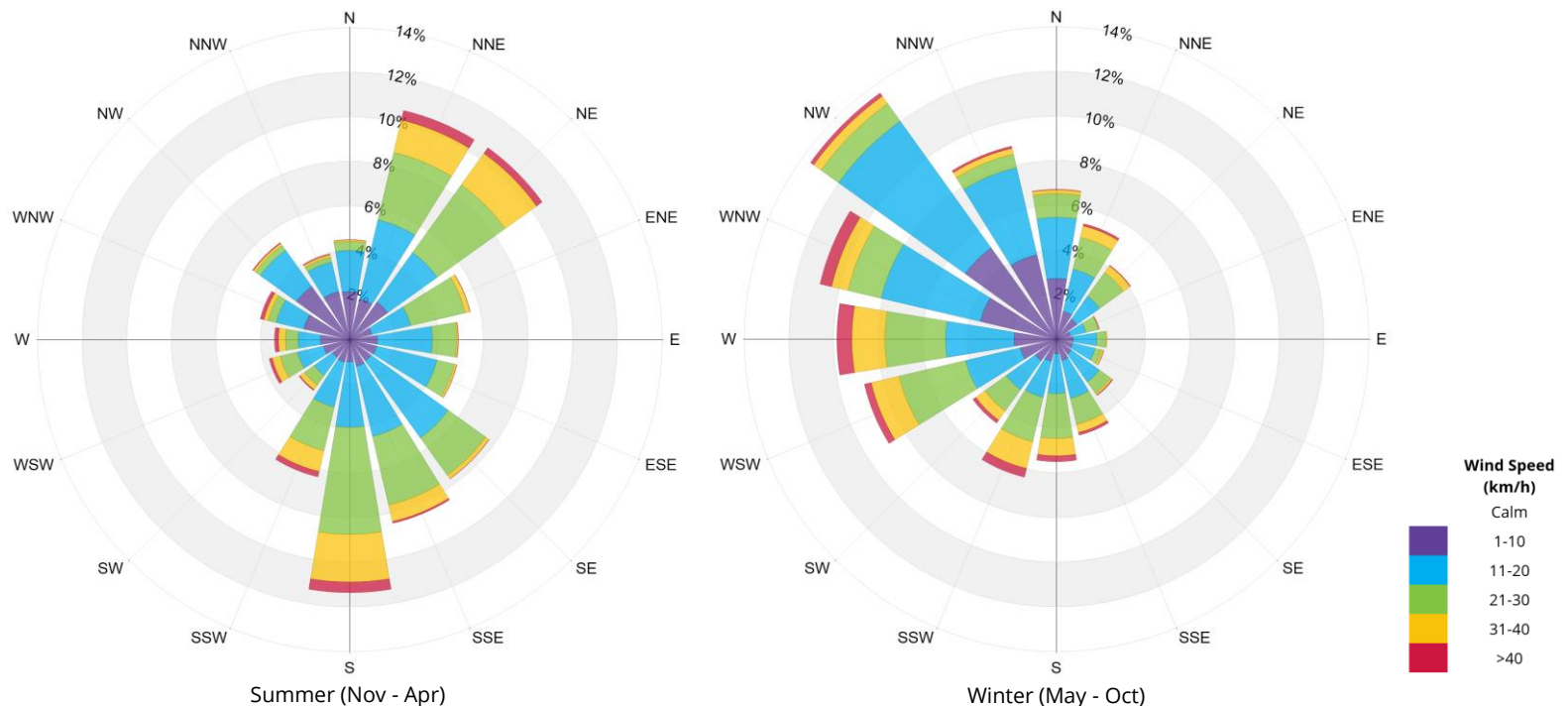
Note that other microclimate issues such as those relating to cladding and structural wind loads, door operability, building air quality, noise, vibration, etc. are not part of the scope of this assessment.

- 
1. H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.
  2. C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", 10th International Conference on Wind Engineering, Copenhagen, Denmark.

### 3. METEOROLOGICAL DATA



Meteorological data recorded at Sydney International Airport from 1995 to 2022 were used as a reference for wind conditions in the area. The distributions of wind frequency and directionality for the summer (November through April) and winter (May through October) seasons are shown in Image 3. The records indicate that winds from the northeast and the southern sectors are predominant during the summer season. Wind from the west and northwest directions are predominant in the winter season and can have an impact on the perceived outdoor thermal comfort of a space. Strong winds with a mean speed exceeding 30 km/h, as measured at the airport at a height of 10 meters, occur more frequently in summer than in winter. During both seasons, strong winds predominantly originate from the south while winds from the northeast are common in summer and winds from west to northwest are common in winter. These winds can potentially be the source of uncomfortable / unsafe wind conditions, depending on the site exposure or development design.



**Image 3: Directional Distribution of Winds Approaching Sydney International Airport**  
Recorded from 1995-2022

# 4. PEDESTRIAN WIND CRITERIA



## 4.1 Pedestrian Wind Safety Criterion

Pedestrian wind safety is associated with excessive gusts that can adversely affect a person’s balance and footing. The *Australasian Wind Engineering Society Guidelines for Pedestrian Wind Effects Criteria* (2024) recommends assessing wind safety using a threshold of 3-second gusts exceeding 83 km/h for more than 0.1% (or 9 hours) per year. Wind conditions surpassing this limit are considered severe and likely to impact pedestrian stability. This has been assessed qualitatively in the current report.

## 4.2 Pedestrian Wind Comfort Criteria

Pedestrian wind comfort is assessed using the criteria developed by Soligo et al.<sup>1,2</sup> which are illustrated in Image 4. These criteria, established at RWDI through extensive research and consulting since 1974, are based on gust-equivalent mean wind speeds. Wind comfort levels are categorised according to the typical/intended pedestrian activity such that higher the activity level, higher the wind speed tolerable while engaged in the activity. Wind conditions are assessed at a typical pedestrian chest height and are considered suitable for the intended use of the space if the associated winds for the category are expected for at least 80% of the time.

1. M.J. Soligo, P.A. Irwin, and C.J. Williams (1993). "Pedestrian Comfort Including Wind and Thermal Effects," Third Asia-Pacific Symposium on Wind Engineering, Hong Kong.

2. M.J. Soligo, P.A. Irwin, C.J. Williams, and G.D. Schuyler (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," Journal of Wind Engineering and Industrial Aerodynamics, vol. 77&78, pp. 753-766.

Wind control measures are recommended for areas where the occurrence frequencies of wind speeds are expected to exceed the threshold values for specific pedestrian activities. It should be noted that these criteria for wind forces represent average wind tolerance and can be subjective with regional differences in wind climate and thermal conditions as well as variations in age, health, clothing, etc. also impacting and individual's perception of the wind climate. For a full assessment of comfort, a thermal comfort study is required.

|                                   |  |  |                                                                                                                                                                     |
|-----------------------------------|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sitting</b><br>≤ 10 km/h       |  |  | Calm or light breezes desired for outdoor seating areas where one can read a paper without having it blown away                                                     |
| <b>Standing</b><br>≤ 14 km/h      |  |  | Gentle breezes suitable for main building entrances, bus stops and locations where pedestrians may linger such as communal terraces                                 |
| <b>Strolling</b><br>≤ 17 km/h     |  |  | Moderate winds that would be appropriate for strolling along a downtown street, plaza or park and where the objective is not to linger                              |
| <b>Walking</b><br>≤ 20 km/h       |  |  | High Winds that can be tolerated if one's objective is to walk, run or cycle without lingering - Also suitable for certain sporting activities                      |
| <b>Uncomfortable</b><br>> 20 km/h |  |  | None of comfort categories above are met - Represents conditions that might be dangerous to the elderly and children and are of a considerable discomfort to others |

Image 4: RWDI Pedestrian Wind Comfort Criteria

## 5. RESULTS AND DISCUSSION



### 5.1 General Wind Flow around Buildings

In the discussion of wind conditions on and around the Proposed Development, reference may be made to the following generalised wind flows (see Image 5). If these building / wind combinations occur for prevailing winds, there is a greater potential for increased wind activity and uncomfortable or potentially unsafe conditions. Design details such as setting back a tower from the edges of a podium for a prevailing wind direction, deep canopies close to ground level, wind screens / tall trees with dense landscaping, etc. can help reduce high wind activity. The choice and effectiveness of these measures would depend on the exposure and orientation of the site with respect to the prevailing wind directions and the size and massing of the proposed buildings.

Conversely, in areas where higher wind velocities are desired, design measures can be implemented to enhance wind flow. For instance, channels aligned with prevailing wind directions can be integrated into the design to promote increased wind infiltration in regions prone to stagnant conditions. Such measures are particularly beneficial in areas with generally milder climates and high humidity levels, such as those closer to the equator.

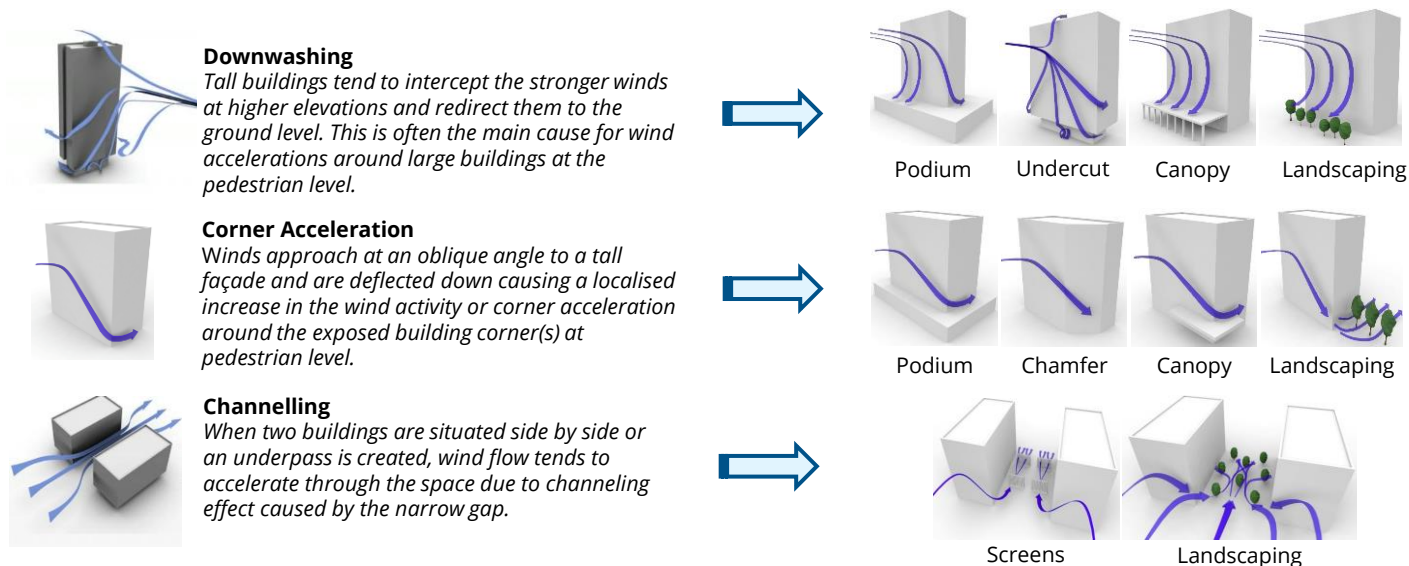


Image 5: General Wind Flow around Buildings with Examples of Common Wind Measures

## 5. RESULTS AND DISCUSSION



### 5.2 Site Exposure and Existing Site Conditions

The exposure of the site to regional prevailing winds is illustrated in Image 6 and discussed below:

1. The upwind terrain to the northeast of the site comprises of open grounds and dense vegetation followed by low-rise residential buildings. This combination is expected to provide substantial buffering against surface-level winds. However, elevated or exposed structures may induce winds effects due to their height.
2. The upwind terrain to the south comprises of low- to mid-rise buildings and dense vegetation within Dalrymple-Hay Nature Reserve which is expected to mitigate south winds as these approach the site.
3. The terrain to the west and northwest comprises of open fields with interspersed trees within the Pymble Golf Club. This is followed by dense vegetation and low-rise suburban housing. While surface-level impacts are expected to be small, exposed structures may create strong wind effects. The rising terrain towards the site is also expected to further increase winds from these directions.

The existing site is currently occupied by a cluster of low-rise buildings. Given the wind exposure at the project site and surrounding context, the wind impact is anticipated to be minimal. Hence, the overall wind environment is likely to be comfortable for passive sitting to standing comfort levels throughout the year. High winds exceeding the comfort or safety limits are not expected within and around the existing site areas.

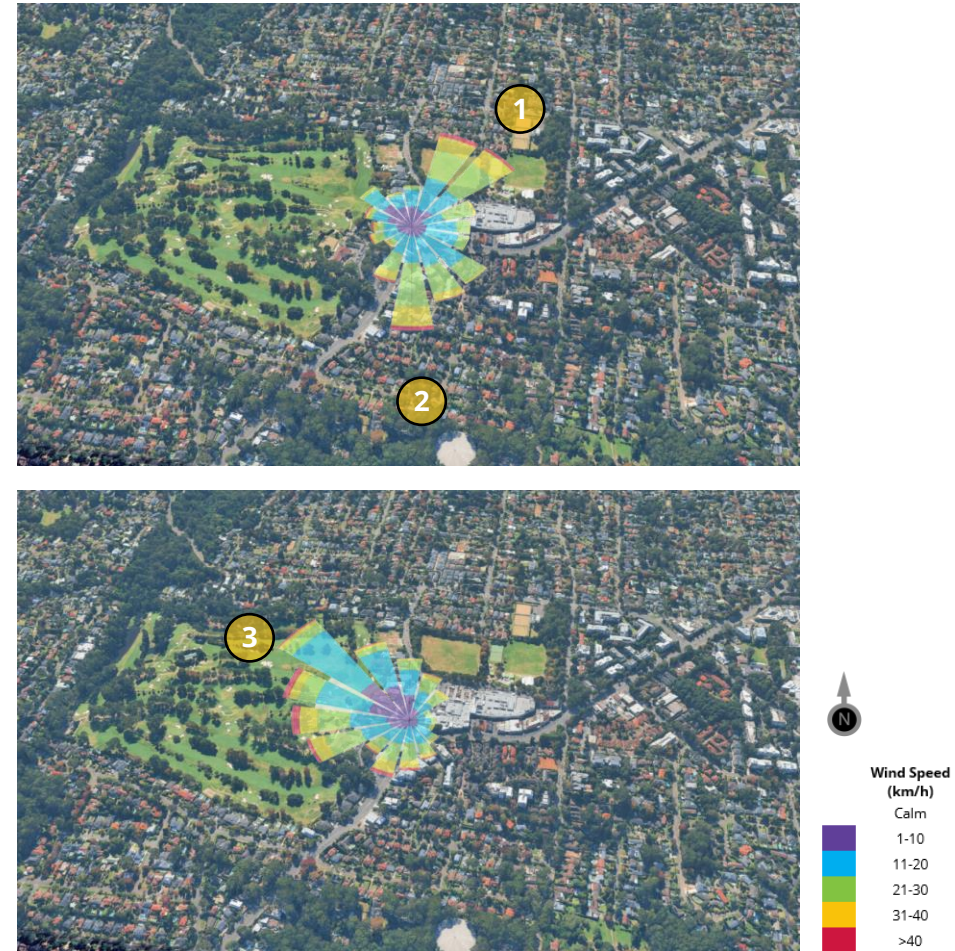


Image 6: Exposure of Site to Regional Prevailing Winds  
Top: Summer | Bottom: Winter

## 5. RESULTS AND DISCUSSION



### 5.3 Proposed Site Conditions

The Proposed Development includes a 9-storey residential building with a U-shaped planform. A summary of the wind conditions is provided below:

- The overall wind conditions around the site are expected to be well within the comfort and safety limits. This is primarily due to the modest height of the building and the articulated U-shaped building form which will assist in breaking up winds.
- The primary lobby entrances are located off Cowan Road and are recessed into the building form. Wind conditions around these are expected to be comfortable for sitting and standing use and are, hence, suitable for the intended use of the space.
- The Ground Level communal open space is sheltered from prevailing winds due to the building form and due to the surrounding dense vegetation. Wind comfort levels are expected to be calm and suitable for sitting to standing use within the space.
- Downwash due to the northeast and northwest sector winds may cause increased winds around the western corners of the building. Furthermore, south winds can also be redirected towards the southwest corner of the site. Hence, winds suitable for strolling use can occur along the Cowan Road front of the building. Wind conditions around the corners may vary from strolling to walking use. These are considered suitable for the intended use of the spaces as pedestrian footpaths. With the inclusion of existing and proposed surrounding vegetation, wind comfort levels are expected to improve by at least a category.
- Wind conditions within the residential balconies on upper levels are expected to benefit from their single-aspect design or through the inclusion of full-height corner screening / blade walls. Wind conditions within these spaces are expected to be comfortable for sitting to standing use throughout the year.
- The Level 7 communal open spaces are sheltered from the prevailing winds during winters due to the building form. Hence, wind comfort levels are expected to be suitable for sitting to standing use during the winter season. In contrast, summer winds originating from the northeast and south are likely to impact these spaces. To mitigate the seasonal impact, the perimeter landscaping should incorporate densely foliating vegetation such as shrubs with a minimum height of 1.5m above the finished floor level (FFL). Alternatively, a taller perimeter screen with a height of 1.5m may be employed to provide a similar buffer to the winds. A combined approach can also be used (e.g. 1.2 m tall perimeter screening with small trees to filter the winds located around the perimeter). Internally, central planters are recommended to reduce wind reattachment within the terraces.
- The corner terraces located on Level 8 may be exposed to stronger wind effects throughout the year and will benefit from the inclusion of 1.8m tall (max. 50%) porous screening along the shorter aspect to mitigate potential wind acceleration.

## 6. SUMMARY



Wind conditions on and around the Proposed Development located at 5-9 Cowan Road in St Ives, NSW are discussed in this report. The qualitative assessment is based on the review of local wind climate and the current design of the Proposed Development. The impact of the surrounding buildings and the local land topography has also been considered. The assessment is based on RWDI's experience with wind tunnel testing and CFD analysis of similar buildings within the region.

Conceptual wind flows around the Proposed Development are discussed in the report for the prevailing wind directions to identify key wind sensitive areas. The review indicates that the surrounding dense vegetation and terrain is likely to mitigate most winds approaching the site. Furthermore, the modest height of the development is not expected to considerably alter the wind environment. Hence, wind comfort levels within the public domain are expected to remain suitable for the intended use of the various spaces within and around the site. Similarly, wind conditions within private balconies are expected to be calm due to location or design. Seasonal impacts can occur within the communal open spaces on Level 7. However, these can be mitigated through the inclusion of densely foliating vegetation or a wind screen with a height of at least 1.5m along the perimeter and inclusion of the central planters. The corner terraces on Level 8 are also expected to benefit from the inclusion of 1.8m tall 50% porous screens to mitigate potential corner wind acceleration effect.

This qualitative approach provides a screening-level estimation of potential wind conditions around the site and offers conceptual wind control measures and design advice suitable for early design of buildings. Additional wind tunnel or computational wind simulations can be undertaken to quantify and confirm the predicted conditions discussed in the report. The conceptual wind control measures can be further refined through these additional studies.

## 7. APPLICABILITY OF ASSESSMENT



The assessment discussed in this report pertains to the Proposed Development in accordance with the drawings and information received in August 2025. In the event of any significant changes to the design, construction or operation of the building or addition of surroundings in the future, RWDI could provide an assessment of their impact on the wind conditions discussed in this report. It is the responsibility of others to contact RWDI to initiate this process.

### **Statement of Limitations**

This report entitled '*5-9 Cowan Road: Pedestrian Wind Assessment*', dated 26 August 2025, was prepared by RWDI Australia Pty Ltd ("RWDI"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilise the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provide.