40-76 WILLIAM STREET
LEICHHARDT

PEDESTRIAN WIND ASSESSMENT

RWDI # 2511603

5 JANUARY 2026

SUBMITTED TO

Anprisa Pty Ltd

SUBMITTED BY

RWDI Australia Pty Ltd
Suite 602, Level 6, 80 William Street,
Woolloomooloo NSW 2011, Australia
ABN 86 641 303 871

rwdi.com

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STATEMENT OF DECLARATION

The undersigned declares that the Pedestrian Wind Assessment Report (PWA Report) has been prepared in accordance with relevant policy, guidelines, or legislative requirements. The PWA Report contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the PWA Report 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 PWA Report relates; and contains a consolidated summary of the proposed or necessary mitigation measures.

Dr. Aman Choudhry *PhD, MIEAUST*
Leader Microclimate | APAC

1. INTRODUCTION

RWDI Australia Pty Ltd (RWDI) was retained to undertake a pedestrian wind assessment for the Proposed Development at 40-76 William Street, Leichhardt, NSW. This pedestrian wind assessment report is prepared in support of a State Significant Development Application (SSDA) (SSD-119545240) and addresses the Planning Secretary's Environmental Assessment Requirements (SEARs) for a residential development. The site is enclosed by William Street to the north, North Street to the west and abuts existing low to mid rise buildings to the east and south. Pioneers Memorial Park lies to the east of the project site with the Leichhardt business centre to the south and the Iron Cove to the north. The location of the project site within its broader surrounding context is shown in Image 1.

The proposed development of a five-to-eleven storey residential flat building comprises:

- The demolition of existing structures including the patrial retention and adaptive reuse of the existing industrial warehouse façade
- Construction of a residential flat building including 203 units, inclusive of 5% affordable housing
- Two basement levels
- Public domain works

This desk-based report discusses the potential impacts of the massing of the Proposed Development on the local wind microclimate and assesses the outdoor wind comfort based on the usability of spaces. The findings of the report are informed by Computational Fluid Dynamics (CFD) simulations for the prevailing wind directions that show the likely wind flow patterns around the proposed massing. Conceptual wind control measures and design advice has also provided, to alleviate any adverse wind conditions.

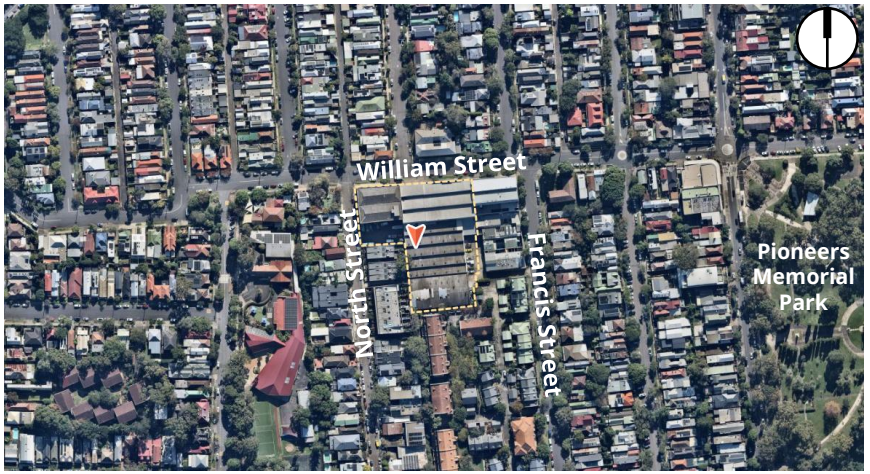

Image 1: Project Location and Surrounding Context

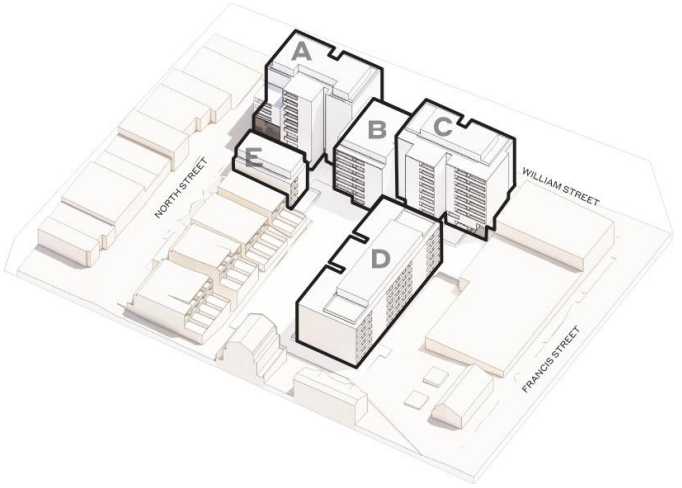

Image 2: Project Overview with Building Designation

1. INTRODUCTION

1.1 Relevant SEARs

In accordance with the Environmental Planning & Assessment Act 1979 (EP&A Act), Planning Secretary's Environmental Assessment Requirements (SEARs) for SSD-119545240 have been issued. This Pedestrian Wind Assessment addresses the following SEARs set out in the table below:

Issue and Assessment Requirements	Response / Location in Report
7 Environmental Amenity • Assess amenity impacts on the surrounding locality, including solar access, visual privacy, view loss and view sharing, as well as **wind**, lighting and reflectivity impacts. A high level of environmental amenity for any surrounding residential or other sensitive land uses must be demonstrated. • Provide a solar access analysis of the overshadowing impacts of the development within the site, on surrounding properties and public spaces (during winter solstice) at hourly intervals between 9am and 3pm, comparing the proposed development, existing situation and where applicable, a development with no bonuses applied.	Section 5
23 Public Space If public space is proposed as part of the development, demonstrate how the development: • maximises the amount, access to and quality of public spaces (including open space, public facilities and streets/plazas within and surrounding the site), reflecting relevant design guidelines and advice from the local council and the Department. • provides accessible public space. • maximises permeability and connectivity. • maximises the amenity of public spaces in line with their intended use, such as through adequate facilities, solar access, shade and **wind protection**. • maximises street activation. • minimises potential vehicle, bicycle and pedestrian conflicts.	Sections 5 and 6

2. BACKGROUND AND METHODOLOGY

2.1 Objectives and Scope

The objective of this assessment is to provide an evaluation of the wind comfort conditions around the Proposed Development site using a 1:1 scale computational model. Predicting outdoor wind conditions is a complex process that involves the combined assessment of building geometry, orientation, position and height of surrounding buildings, upstream terrain and the local wind climate. Computational Fluid Dynamics is a useful tool for this as it not only combines the impact of these various parameters but can also provide a visual reference for the merits of a particular design of the building.

This analysis was, therefore, based on the following:

- A review of the regional long-term meteorological data.
- Use of the Orbital Stack Direct, an in-house CFD tool, to provide numerical estimation of potential wind conditions around the site for the prevailing winds. The simulation models have been based on the information provided to RWDI during July 2025.
- RWDI's engineering judgement, experience, and expert knowledge of wind flows around buildings including wind tunnel studies undertaken for similar projects in the region.

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.

2.2 CFD in Urban Wind Modelling

CFD is a numerical technique that can be used for simulating wind flows in complex environments. For this analysis, CFD techniques were used to generate a virtual wind tunnel where flows around the site and its surroundings were simulated in full scale. The computational domain that covered the site and its surroundings was divided into millions of small cells where calculations were performed, yielding a prediction of wind conditions across the entire study domain. CFD excels as a tool for wind modelling, presenting early design advice, comparing different design and site scenarios, resolving complex flow physics, and helping diagnose problematic wind conditions.

While the computational modelling method used in the current assessment does not explicitly simulate the transient behaviour of turbulent wind, its effects were estimated based on other calculated quantities. RWDI has found this approach to be appropriate for the assessment of typical wind comfort conditions. Wind safety issues, which relate to transient, higher-speed gusts, are discussed qualitatively, based on the CFD predictions and RWDI's extensive wind-tunnel experience for other projects in the area. In order to quantify the transient behaviour of wind and refine any conceptual mitigation measures, a more detailed assessment would be required using either boundary-layer wind tunnel or more detailed transient computational modelling.

2. BACKGROUND AND METHODOLOGY

2.3 Simulation Model

Wind flows were simulated using Orbital Stack, an in-house computational fluid dynamics (CFD) tool that has been validated using RWDI's historical wind tunnel test data and experience. Simulations were conducted for the following site configurations:

- Proposed Configuration: 40-76 William Street Proposed Development with Existing Surrounding Buildings (see Image 3).

For this computational study, the 3D models were simplified to focus on elements most likely to influence local wind flows and solar exposure in and around the site. Landscaping, as per AWES Guidelines[1], and smaller architectural and accessory features on the surrounding buildings were excluded from the model. Local topographic variations were modelled to account for the changes in the wind speeds that can occur due larger variations of topography.

Note that assessments on existing and future configurations of the site have been also provided. However, these are qualitative only and no simulations have been undertaken for these scenarios.

2.4 Methodology

Winds approaching from sixteen cardinal directions were simulated accounting for the effects of the atmospheric boundary layer and terrain impacts upwind of the project site. The wind field was assumed to be steady in time and, as such, the transient effects of strong wind gusts and vortex shedding was not included directly. Turbulence was modelled in the wind simulations by a Reynolds Averaged Navier-Stokes (RANS) approach using the k-epsilon (RNG) turbulence closure. These results were then combined with the meteorological data (Section 3) to determine the variation of wind speeds in the areas of concern at typical pedestrian chest height (i.e., 1.5 m above local grade). These conditions were then assessed against the wind criteria for pedestrian comfort (Section 4) and, the spaces were categorised accordingly.

The method for CFD simulation is consistent with internationally recognised good practice, and meets the requirements set out in the AWES CWE QAM (2024)[2].

1. Australasian Wind Engineering Society (AWES), 2024, "Guidelines for Pedestrian Wind Effects Criteria".
2. Australasian Wind Engineering Society, QAM-3, 2024, "AWES Computational Wind Engineering Quality Assurance Manual".

2. BACKGROUND AND METHODOLOGY

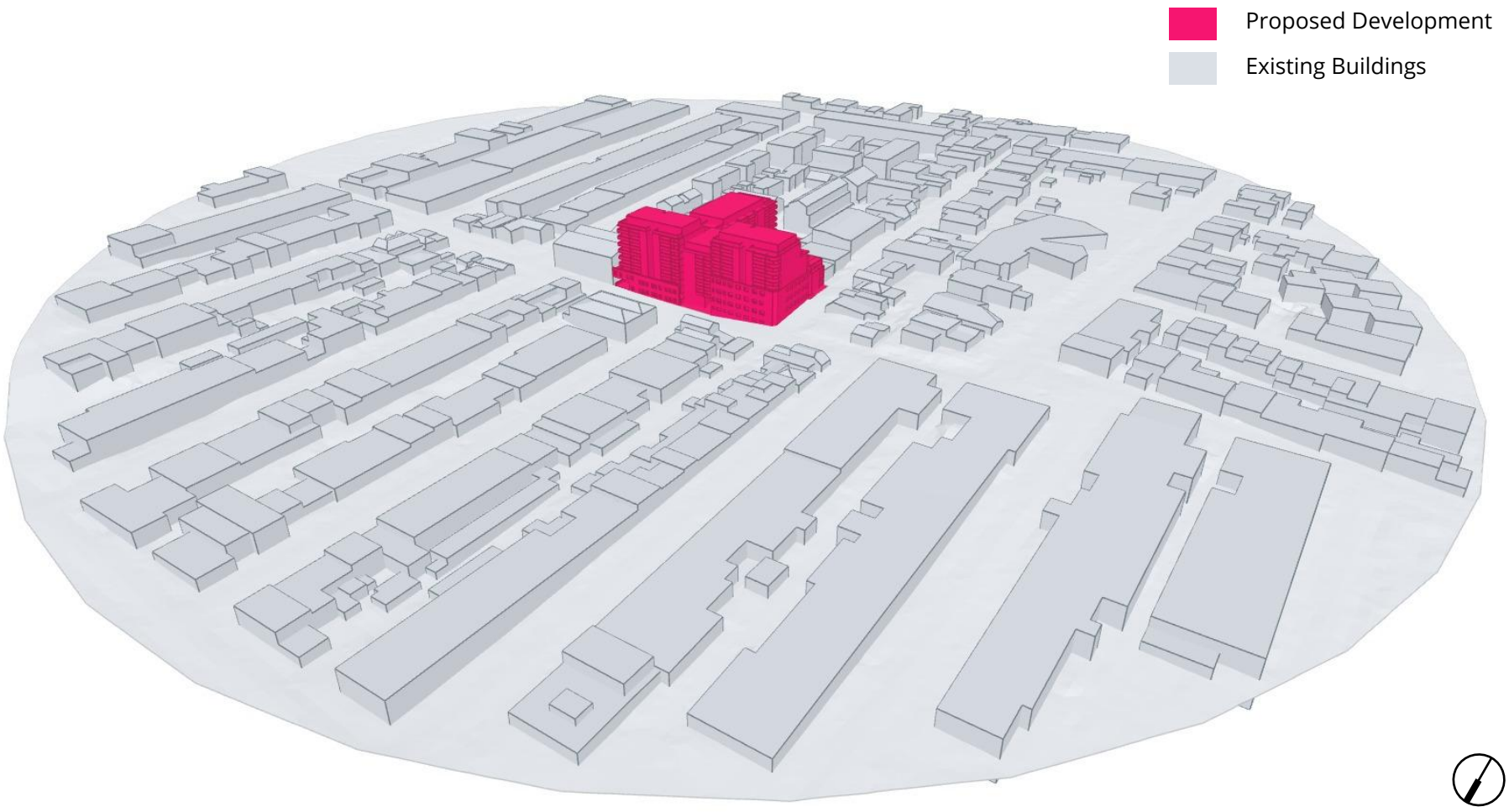

Image 3: Computer Model of the Proposed Configuration

2.5 Factors Affecting Wind Flows

In the discussion of wind conditions on and around the Proposed Development, reference may be made to the following generalised wind flows (see Image 4). 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 for increased thermal comfort, 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 wind climates and high humidity levels, such as those closer to the equator.

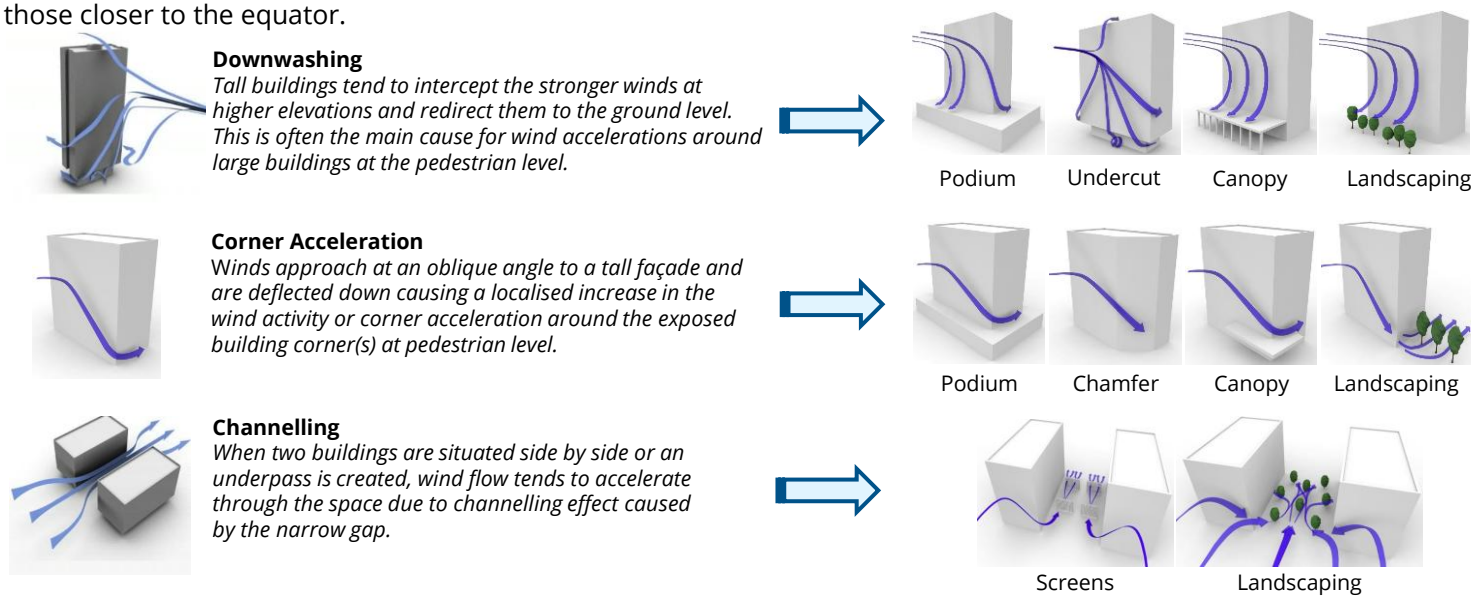

Image 4: General Wind Flow around Buildings with Examples of Common Wind Measures

3. METEOROLOGICAL DATA

Meteorological data recorded at Sydney International Airport for the period from 1995 to 2022 were used as a reference to assess wind conditions in the study area. Image 5 depicts the directional distributions of wind frequencies and speeds recorded at the station over this time. The records indicate that winds from the northeast, south and west to northwest directions are predominant in region throughout the year.

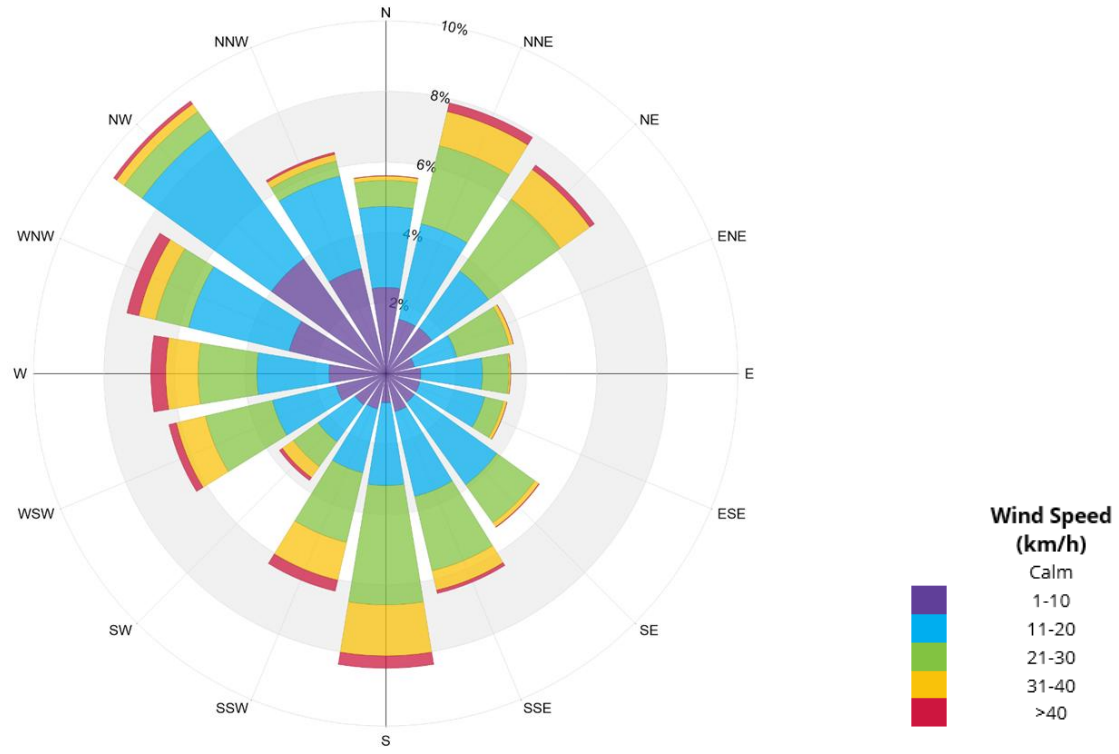

Image 5: Directional Distribution of Winds Approaching Sydney International Airport
Recorded from 1995 - 2022

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.[1, 2] which are illustrated in Image 6. 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. 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.

Image 6: RWDI Pedestrian Wind Comfort Criteria

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.

5. RESULTS AND DISCUSSIONS

5.1 Existing Site Conditions

The existing site is currently occupied by 2 to 4 storey commercial buildings with the immediate surroundings generally comprised of low-rise buildings of a similar height and an open park area to the east. Given the site's exposure and the surrounding context, wind impacts are expected to be minimal. As a result, overall wind conditions across the site are anticipated to remain within comfortable thresholds for standing and strolling use along footpaths throughout the year. High wind events exceeding safety criterion are not expected within or around the existing site areas.

5.2 Proposed Site Conditions

The predicted annual wind comfort conditions for the Proposed Configuration are presented in Images 7a to 7f for the ground level, rooftop terraces, and balcony areas of the development. Wind comfort results are presented as colour contours based on the criteria discussed in Section 4. The contours represent the conditions predicted at a horizontal plane approximately at 1.5m above the local level. Note that landscaping has not been included in the current round of simulations. Interaction of the prevailing winds with the Proposed Configuration are also shown in Appendix A Images A1 to A3.

5.2.1 Ground Level

Wind conditions with the inclusion of the proposed development are expected to be typically comfortable for standing and sitting use with areas exposed at the intersection of William Street and North Street and along the north-south through site link ranging up to walking use which is suitable for the intended pedestrian thoroughfare use (refer to Images 7a).

The southern communal park area, west of Building D, is well protected from the prevailing winds by the subject buildings to the north and east, and the existing buildings to the south and west. Therefore, the wind conditions are expected to range from sitting to standing use.

Wind conditions at the lobby entrances of the various buildings are generally expected to remain calm, as most are located within recessed or sheltered areas. These locations are anticipated to achieve wind comfort levels suitable for sitting use, aligning well with their intended function as transitional and waiting spaces. However, the lobby entrance to Building B, positioned along the north–south through-site link, may be subject to increased wind exposure due to channelling effects noted above. The recessed design of the entrance may offer some shelter and serve as a transitory zone for individuals moving between controlled indoor environments and the external pathway.

Note that wind conditions have been assessed without the inclusion of landscaping and, hence, the above is a conservative estimate of the site wind comfort conditions. With the inclusion of landscape, the overall comfort levels are expected to improve by at least a category.

5.2.2 Private Open Spaces (POS)

The proposed development includes private open spaces (POS) throughout the height of the various buildings. The wind conditions within these POS are indicated in Images 7b – 7f. It is noted that for private balconies, the recommended wind comfort level is typically from standing to strolling use or better. However, as the usage of these spaces is elective, with occupants having the option to retreat indoors during events of high winds, wind conditions can be considered suitable if these do not exceed the comfort criteria. Key wind conditions and impacts are noted below:

- Wind conditions within most POS throughout the height of the various buildings are expected to be comfortable for their intended use.
- The Level 6 northern and southern rooftop POS of Building D are in more open locations and generally exposed to the prevailing winds. While the northern POS is more shielded from the southerly winds, the north-easterly and westerly winds directly impact and channel across the terrace space creating wind conditions ranging from standing near the building façade to strolling along the northern portions of these spaces. The southern POS is more directly exposed to all prevailing wind directions, and these can create conditions ranging from strolling to walking use.
- The Level 9 and 10 rooftop POS on Buildings C and A, respectively, are exposed to regional winds which accelerate around the corners. This can lead to conditions ranging from standing use away from the corners to walking and uncomfortable conditions near the corners
- Corner POS located along the western aspect of Building A are more exposed to wind accelerations effects. Overall wind conditions are expected to be comfortable within these spaces. However, conditions near the corners are expected to be suitable for walking use. It is noted that these are very small areas compared to the overall size of the POS. Hence, overall usability is not likely to be impacted.

5.2.3 Addition of Half Level

It is understood that an additional half level may be added on Level 7 above Building D. This is not expected to impact the overall conditions on the ground level or the public domain. However, the additional level may have a minor impact on the channelled flows along the northern terraces on Level 6 and corner acceleration from the north-westerly winds within the south-eastern terrace on Level 6. However, overall change is not likely to alter comfort levels.

5. RESULTS AND DISCUSSIONS

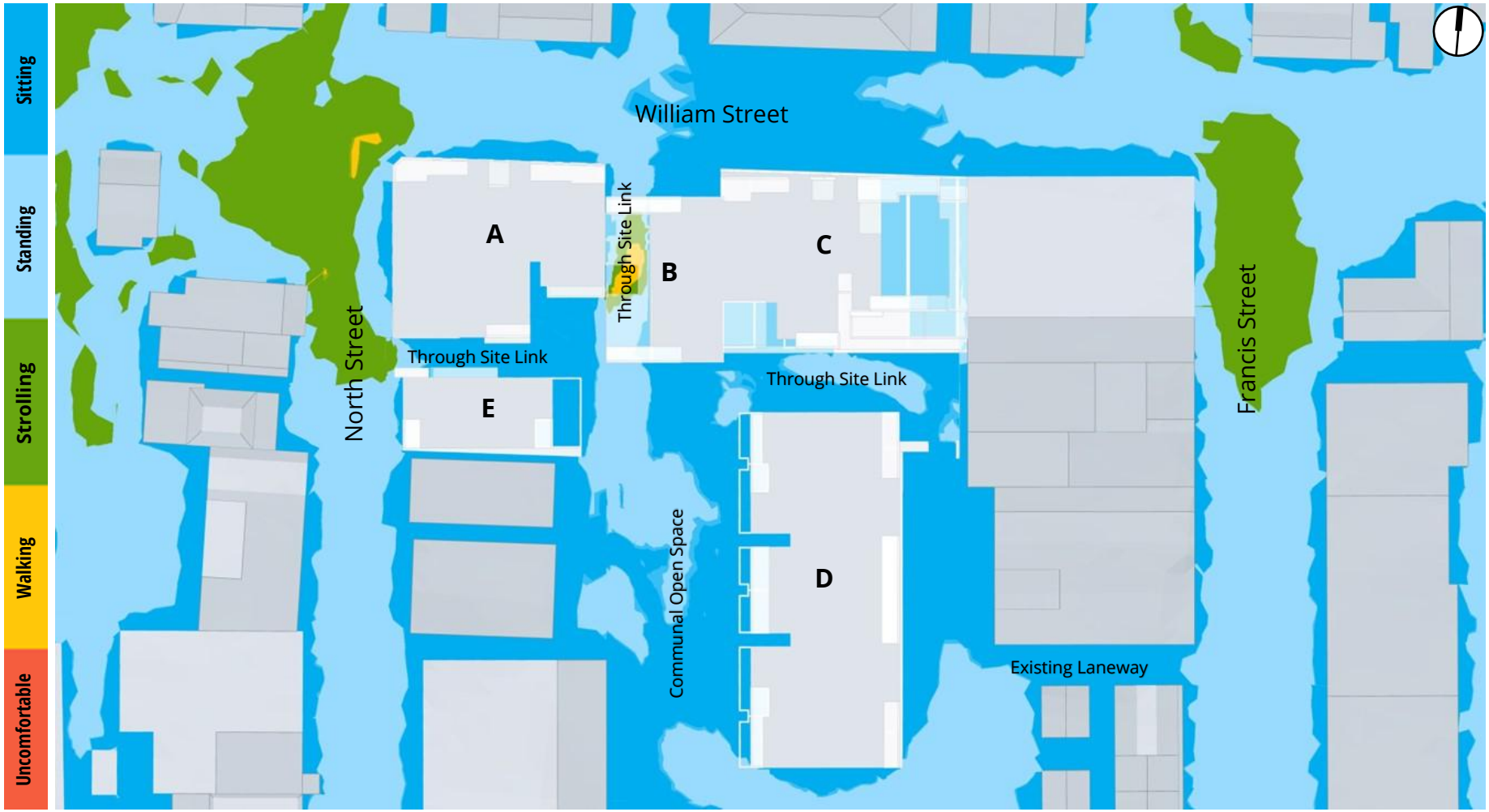

Image 7a: Annual Wind Comfort Conditions – Ground Level

Image 7b: Annual Wind Comfort Conditions – Roof Level

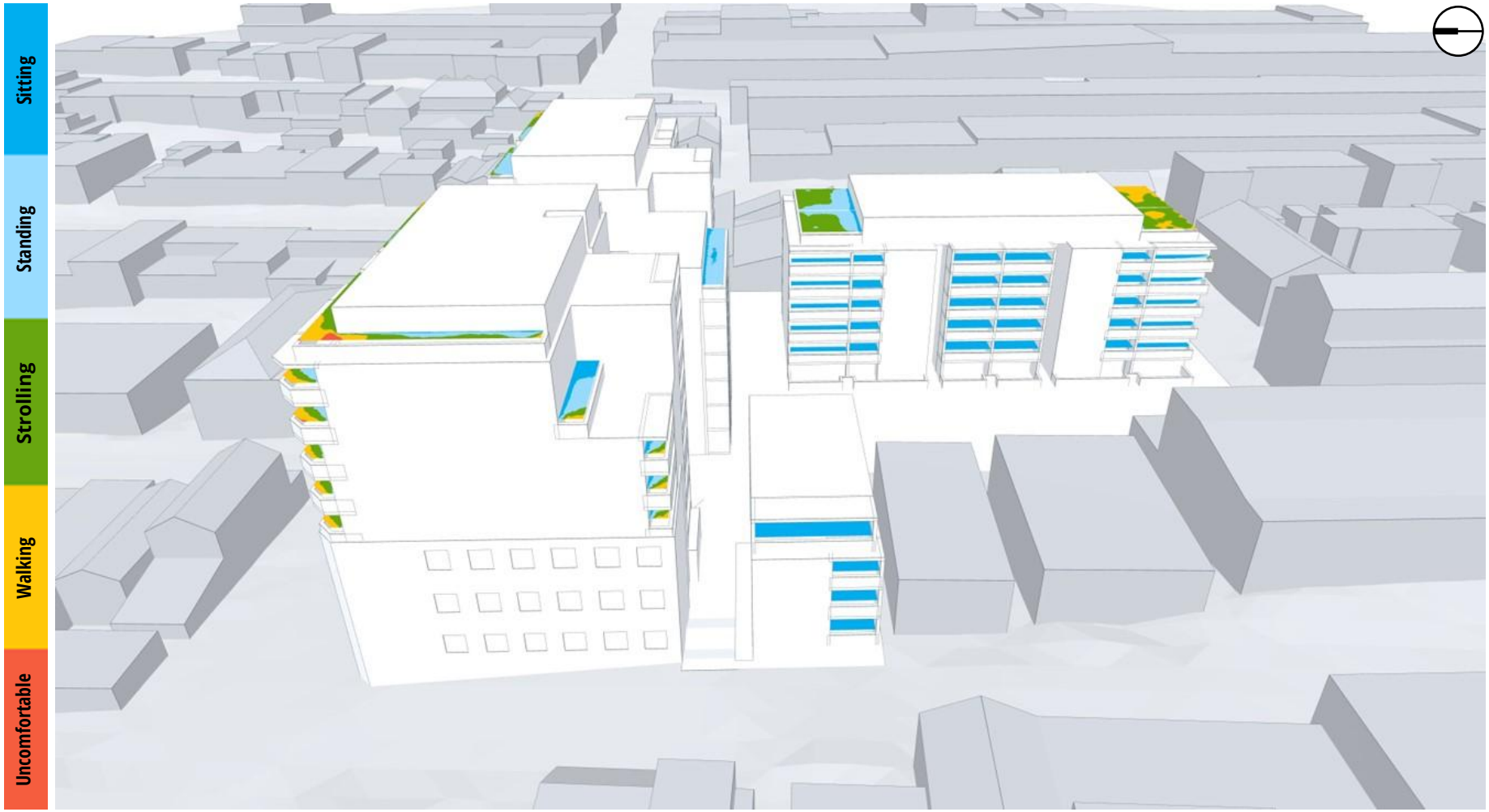

Image 7c: Annual Wind Comfort Conditions – Private Balconies
View from West

Image 7d: Annual Wind Comfort Conditions – Private Balconies
View from North

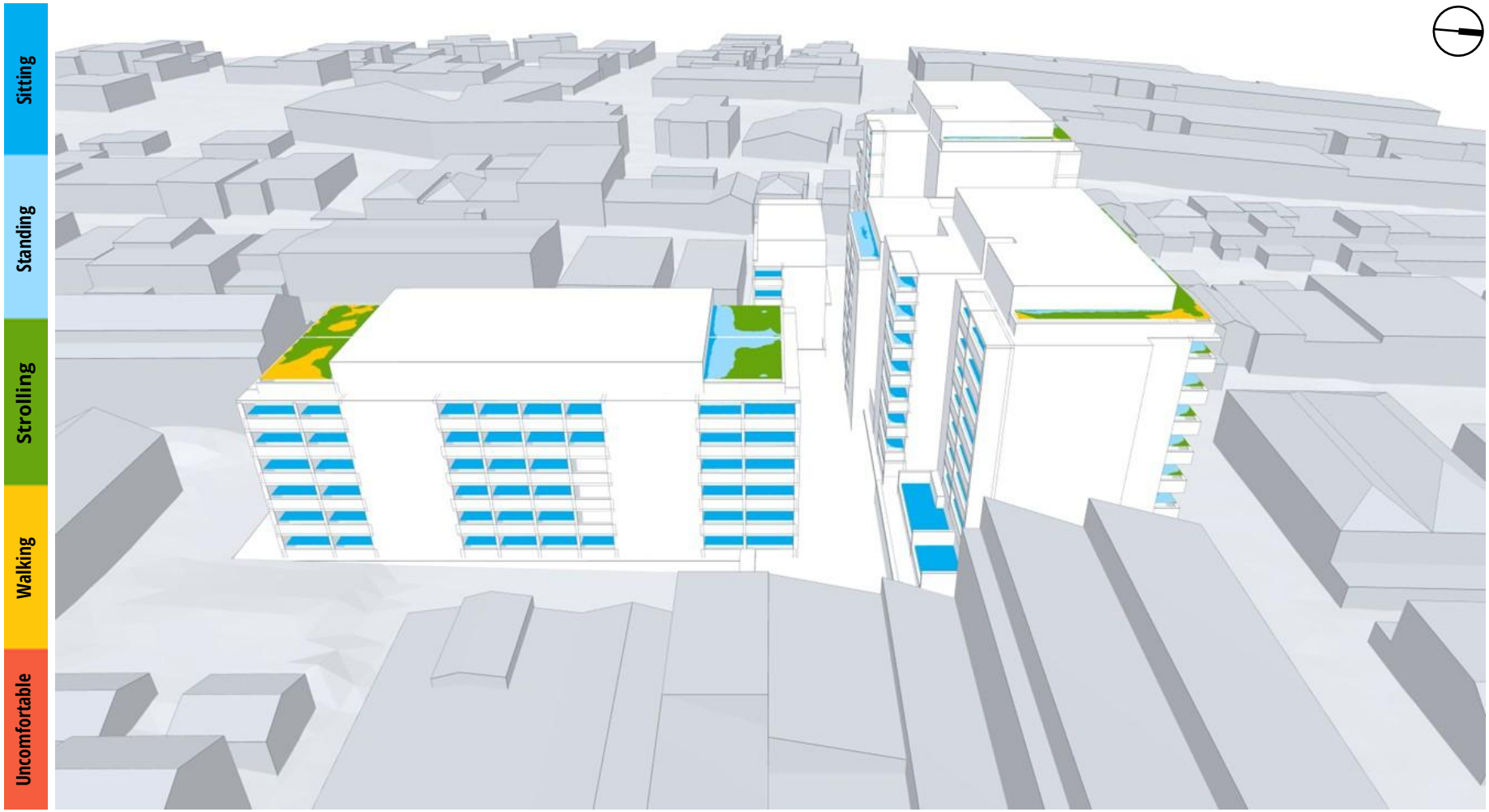

Image 7e: Annual Wind Comfort Conditions – Private Balconies
View from East

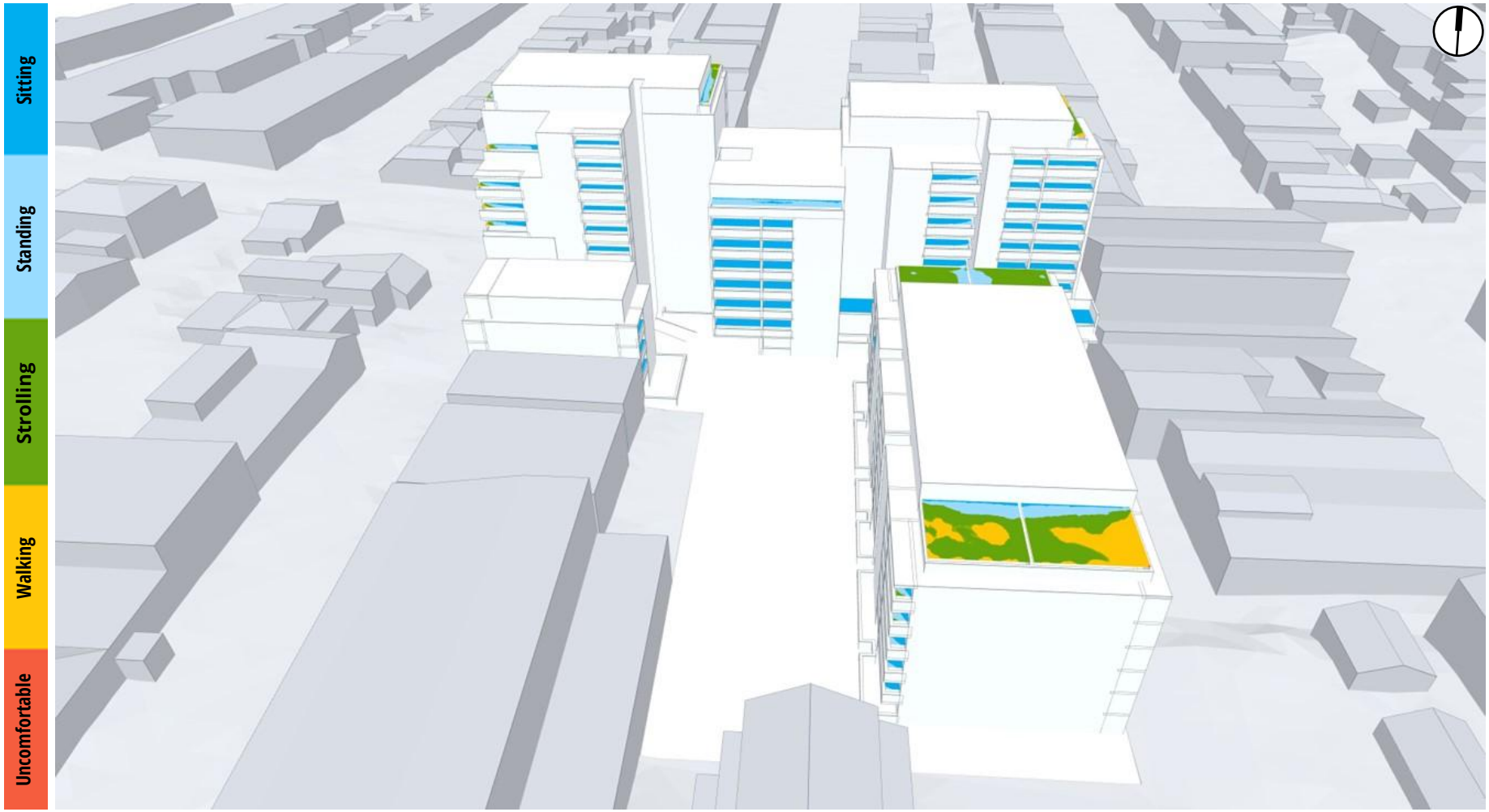

Image 7f: Annual Wind Comfort Conditions – Private Balconies
View from South

5.3 Future Wind Conditions

Note that the wind commentary provided in this report for Proposed Configuration of the site is based on the existing surrounding context.

It is noted that as part of the Inner West Council's "Our Fairer Future Plan", there has been a review of Residential Zonings and Heights of the Leichhardt area (see Image 8). The future context around the proposed development is expected to generally remain low rise residential with high-rise residential buildings expected to be developed further to the edges of Leichhardt which replace the existing predominantly low-rise residential buildings. With consideration of the potential future context the overall wind conditions of the proposed development are not expected to significantly change compared to those discussed in Section 5.2.

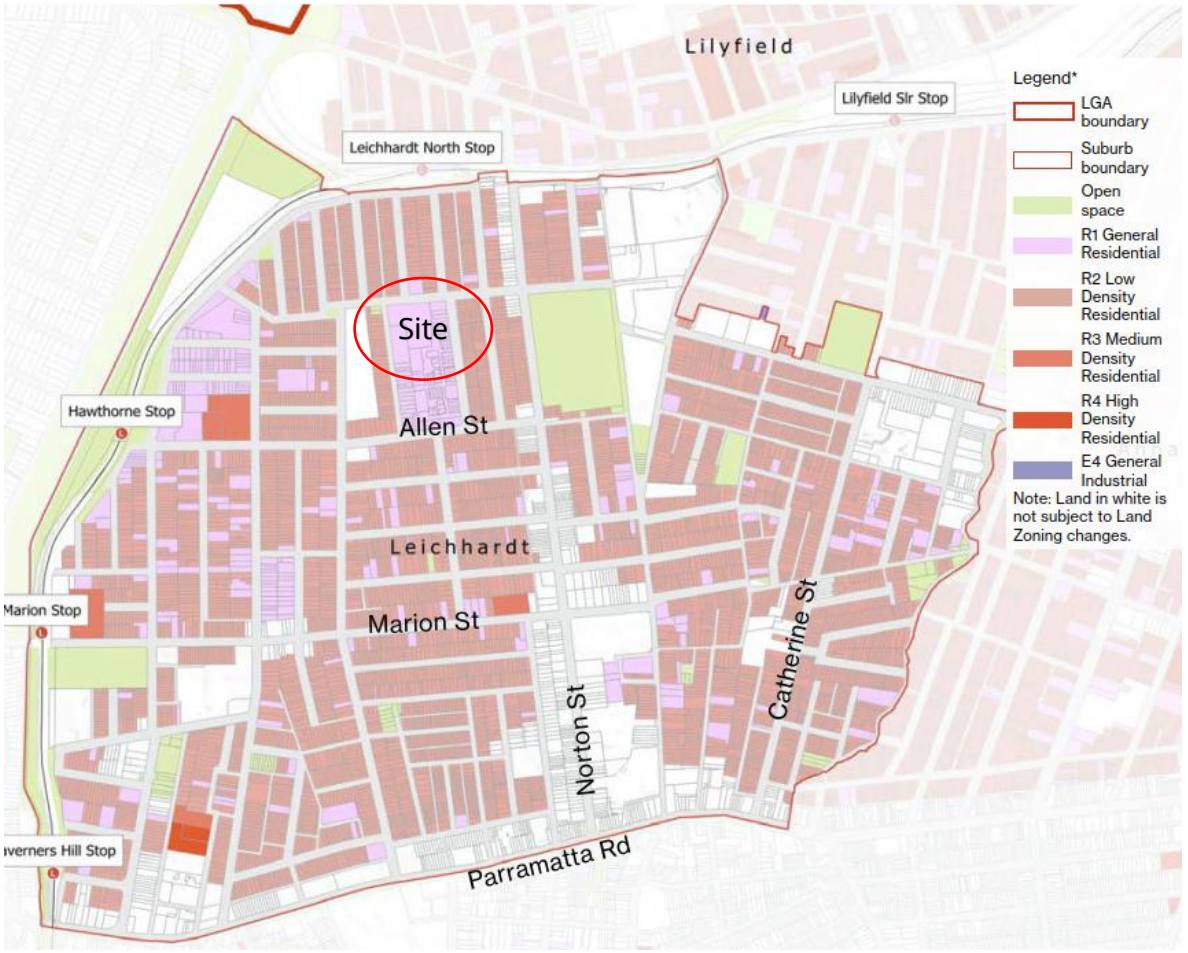

Image 8: Review of Residential Zonings and Heights - Leichhardt
Source: Our Fairer Future Plan - Council's Alternate Approach for New Housing - Appendix 1 (May 2025)

6. DESIGN ADVICE AND RECOMMENDATIONS

Based on the discussions provided and review of latest drawings and information received by RWDI on 3 November 2025, the following design advice and wind control measures can be incorporated to improve the overall wind environment around the site.

6,1 Landscape Design

- It is understood that the development site will be landscaped with numerous trees and shrubs along the street fronts, around the perimeter of the site and within the communal park on ground level. Plantings with large crowns and dense foliage, complemented with underplanting to prevent wind flows from accelerating under the crowns, will help reduce wind activity immediately around them and further downwind.
- Proposed seating areas are recommended to be relocated away from the centre of the through-site link within calmer wind regions (refer to Image 7a for heatmap of wind conditions). Localised measures such as planter boxes or screening can be included around seating areas to further improve wind comfort.

6.2 Private Open Spaces (POS)

- The larger POS on Level 6 of Building D should include taller perimeter balustrades to mitigate direct winds (~1.4m). Wind reattachment should be countered through interspersed landscaping or central canopies, in particular for the southern POS. It is also recommended to increase the intertenancy screening height to 1.8m to reduce winds.
- It is recommended to increase the height of the perimeter balustrade for the rooftop POS of Buildings A and C, as indicated in Image 9 for the latest design. It is also recommended to include 1.8m high screening at the corners of these balconies. Similar screens can be included within the wider Building B POS to partition the space near the corner to further reduce winds. Densely foliating shrub planting can also be included along the non trafficable areas around these balconies to further reduce the strength of winds.
- For all other POS, it is recommended to retain impermeable balustrades to a height of 1.2 m.

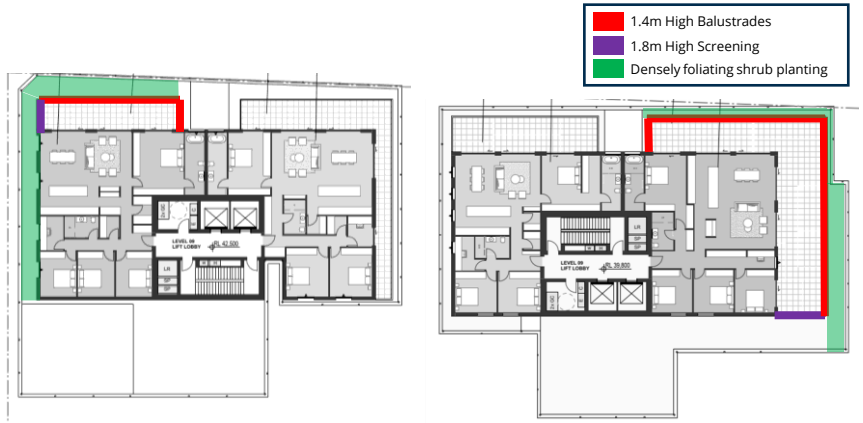

Image 9: Markup of Wind Control Measures
Left: Level Rooftop Terraces of Buildings A and C

7. STATEMENT OF LIMITATIONS

Wind comfort conditions around the Proposed Development located at 40-76 William Street, Leichhardt are discussed in this report. This assessment is based on the CFD analysis of the proposed massing of the buildings using Orbital Stack. The findings of the report should be assessed based on the limitations listed below:

1. The analysis presented was based on the historical climate conditions for the region.
2. It is noted that the conditions presented herein depict statistical conditions for selected time periods. It would be prudent to be consider that specific seasonal trends (e.g., a heatwave) would be expected to result in ambient conditions which could create longer durations of uncomfortable conditions. Thermal comfort studies provide a more a holistic assessment of perceived comfort.
3. The effect of climate change (i.e., forward predictions of trends in meteorological conditions) has not been considered in the analysis. However, the use of the latest meteorological information should give some indication.
4. The CFD simulations were conducted using a steady-state analysis. This means that the wind speed predictions represent an 'average' of the expected conditions within and around the development. As such, RWDI would expect the comfort conditions to be more dynamic in reality than the 'static' figures presented herein.
5. Gusts are an important part of the overall wind microclimate that can impact safety, and these have only been considered qualitatively in the current assessment. A more detailed assessment would be required using either a boundary-layer wind tunnel or more detailed transient computational modelling to evaluate the gust response of the development as the design evolves.

8. APPLICABILITY OF ASSESSMENT

The assessment discussed in this report pertains to the Proposed Development in accordance with the drawings and information received in July and November 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.

This report entitled "*40-76 William Street: Pedestrian Wind Assessment*", dated 5 January 2026, 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 provided.

APPENDIX A

STREAMLINES AND WIND FLOWS

APPENDIX A

Image A1: Interaction of Prevailing Winds with Proposed Massing
Winds from 45° sector

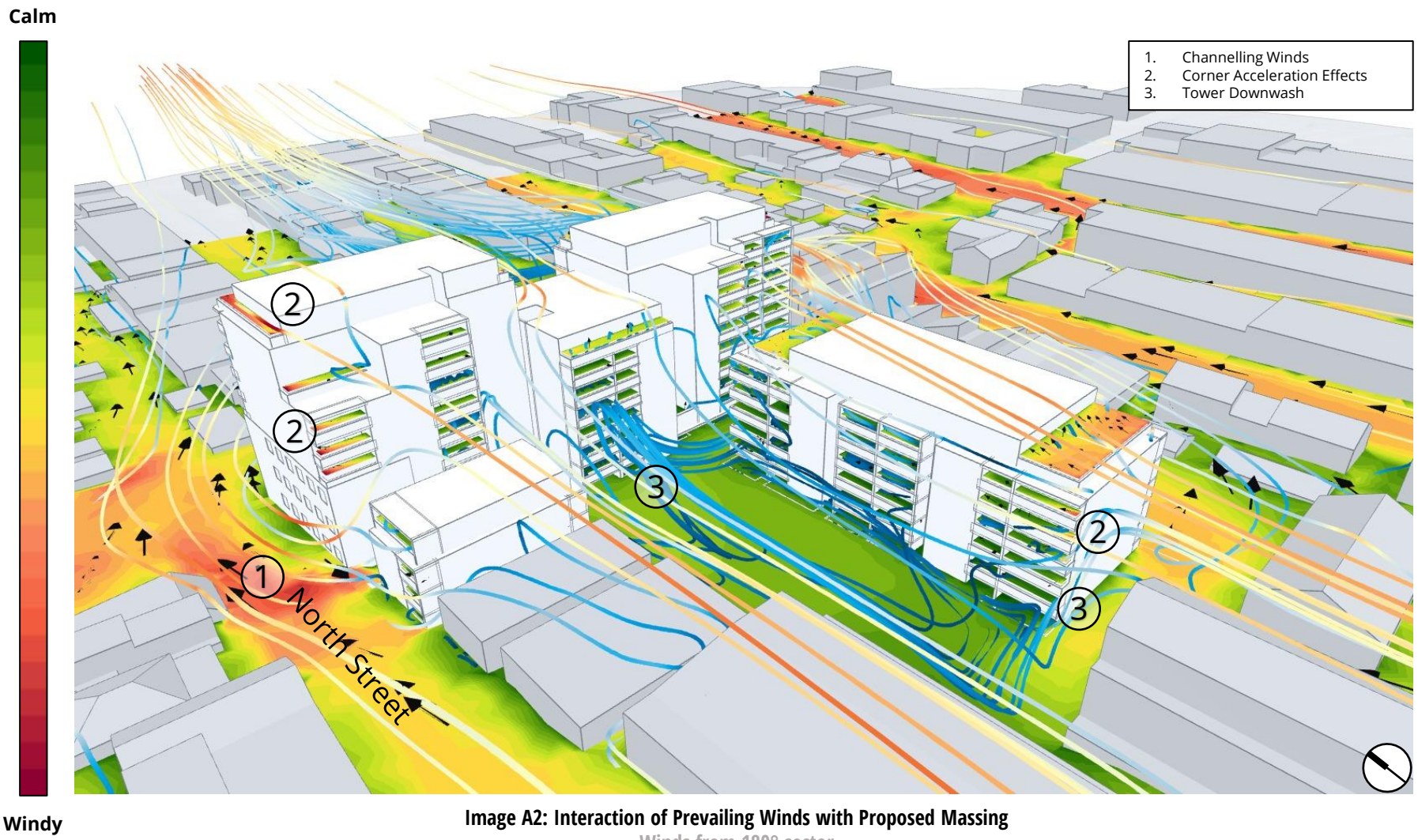

Image A2: Interaction of Prevailing Winds with Proposed Massing
Winds from 180° sector

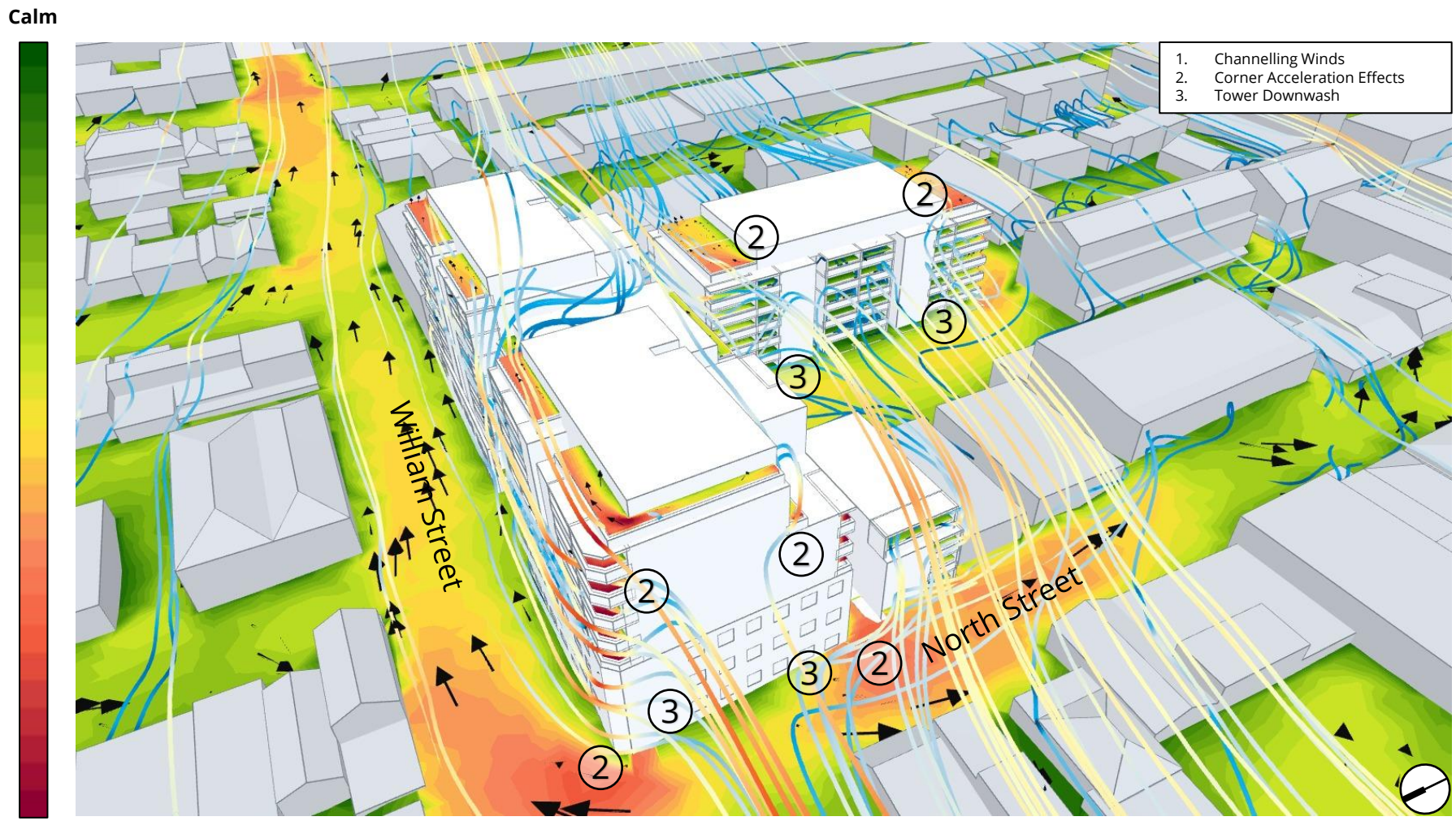

Image A3: Interaction of Prevailing Winds with Proposed Massing
Winds from 270° sector