WINDTECH

PEDESTRIAN WIND ENVIRONMENT STATEMENT

MELROSE PARK GATEWAY

WJ240-01F02(REV1)- WS REPORT

AUGUST 28, 2025

Prepared for:

Hope & Hughes Pty Ltd ATF Hope and Hughes Trust

NSW 2016

AT THE LEADING EDGE

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DOCUMENT CONTROL

Date	Revision History	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
July 16, 2025	Initial.	0	NR	MM	MLO
July 23, 2025	Revised drawings and treatments.	1	NR	MM	MLO
August 28, 2025	Site address updated.	2	NR	MM	JAN

EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the proposed Melrose Park Gateway development, located at 19 Hope Street, Melrose Park and 69, 71, 73, 75, 77 Hughes Avenue, Ermington, on the local wind environment at the critical outdoor areas within and around the subject site. The effect of wind activity has been examined for the three predominant wind directions for the region, namely the north-easterly, south to south-easterly, and westerly winds. The analysis of the wind effects relating to the proposed development have been carried out in the context of the local wind climate, building morphology and land topography.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the latest architectural drawings. No wind tunnel testing has been undertaken for the subject development, and hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection of the architectural drawings provided (received 4 July 2025). Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

The results of this assessment indicate that the development has incorporated several design features and wind mitigating strategies and is expected to be suitable for the intended use for the majority of the outdoor trafficable areas. However, there are some areas that are likely to be exposed to stronger winds. It is expected that the wind effects identified in the report can be ameliorated with the consideration of the following treatment strategies into the design of the development:

- Lower Ground/Ground level trafficable areas:
    - Retention of the proposed awnings along the western, southern and eastern aspects.
    - Retention of the proposed impermeable screening and adjacent planters.
    - Retention of the proposed trees and dense landscaping.
- Communal Open Space on Level 01:
    - Retention of 1.1m high impermeable balustrades.
    - Retention of impermeable awning/shade structures.
    - Extension of screening along the northern stairway to 1.5m above finished floor.
    - Retention of trees. Recommended to be at least 3-4m high densely foliating, evergreen with interlocking canopies where possible.
    - Retention of the proposed dense landscaping.
- Communal Open Space on Level 15:
    - Retention of 1.1m high impermeable balustrades.
    - Retention of impermeable shade structure.

- Retention/inclusion of trees. Recommended to be at least 3-4m high densely foliating, evergreen with interlocking canopies where possible.

- Retention of the proposed dense landscaping.

With the inclusion of the abovementioned recommendations in the final design, it is expected that wind conditions for the various trafficable outdoor areas within and around the development will be suitable for their intended uses, and that the wind speeds will satisfy the applicable criteria for pedestrian comfort and safety. Nonetheless, wind tunnel testing is recommended to be undertaken at a more detailed design to quantitatively assess the wind conditions and to optimise the size and extent of the treatments required.

CONTENTS

1 INTRODUCTION

An opinion on the likely impact of the proposed design on the local wind environment affecting pedestrians within the critical outdoor areas within and around the subject development is presented in this report. The analysis of wind effects relating to the proposed development has been carried out in the context of the predominant wind directions for the region, building morphology of the development and nearby buildings, and local land topography. The conclusions of this report are drawn from our extensive experience in the field of wind engineering and studies of wind environment effects.

No wind tunnel testing has been undertaken for this assessment. Hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection, and any recommendations in this report are made only in-principle.

A list of the architectural drawings referenced for this assessment is provided in the table below in Table 1.

Table 1: List of Architectural Drawings Referenced

Drawing No. and Title	Rev	Date
DA-110-008_ Lower Ground Level_A	A	22/07/2025
DA-110-009_ Ground Level_A	A	22/07/2025
DA-110-010_ Level 01_A	A	22/07/2025
DA-110-020_ Level 02_A	A	22/07/2025
DA-110-030_ Level 03-06_A	A	22/07/2025
DA-110-070_ Level 07_A	A	22/07/2025
DA-110-080_ Level 08_A	A	22/07/2025
DA-110-090_ Level 09 - 14_A	A	22/07/2025
DA-110-150_ Level 15_A	A	22/07/2025
DA-110-150_ Level 16_A	A	22/07/2025
DA-110-170_ Level 17 (ROOF)_A	A	22/07/2025
DA-210-101_ North Elevation_A	A	22/07/2025
DA-210-201_ East Elevation_A	A	22/07/2025
DA-210-301_ South Elevation_A	A	22/07/2025
DA-210-401_ West Elevation_A	A	22/07/2025
DA-220-101_ Site Context Elevations_A	A	22/07/2025
DA-310-101_ Section A-A_A	A	22/07/2025
DA-310-102_ Section B-B_A	A	22/07/2025
DA-310-103_ Section C-C_A	A	22/07/2025

2 DESCRIPTION OF DEVELOPMENT AND SURROUNDINGS

The site is located at the corner of 19 Hope Street, Melrose Park and 69, 71, 73, 75, 77 Hughes Avenue, Ermington. with commercial buildings to the immediate east and residential buildings to the north. The sites surrounding the subject development include vacant parcels of land to the north-east with low-rise commercial and residential buildings to the south and west respectively. Further from the site are a few mid-rise apartment buildings to the north and the Parramatta River to the south.

A survey of the land topography indicates a gradual slope towards the south and an incline towards the north, however, there are no major elevation changes in the area immediately surrounding the site.

An aerial image of the subject site and the local surroundings is shown in Figure 1, with the frequency and magnitude of the prevailing winds is superimposed for each wind direction.

The existing site consists of 1 to 2 storey residential buildings and an empty site. The proposed development consists of four tower elements ranging from 7 to 18 storeys high.

The critical outdoor trafficable areas associated with the proposed development, which are the focus of this assessment with regards to wind effects, are listed as follows:

- Ground Level areas and pedestrian footpath.
- Communal Open Space located on Level 01 of the podium and on Level 15 of Building A.
- Private balconies and terraces.

Figure 1: Aerial Image of the Site Location and Prevailing Wind Directions

3 REGIONAL WIND

The Western Sydney region is governed by three principal wind directions that can potentially affect the subject development. These winds prevail from the north-east, south to south-east, and west. These wind directions were determined from an analysis undertaken by Windtech Consultants of recorded directional wind speeds obtained from the meteorological station located at Bankstown Airport by the Bureau of Meteorology (recorded from 1993 to 2016). The data has been corrected to represent winds over standard open terrain at a height of 10m above ground level. The results of this analysis are presented in Figure 2 in the form of a directional plot of the annual and 5% exceedance mean winds for the region. The frequency of occurrence of these winds is also shown in Figure 2.

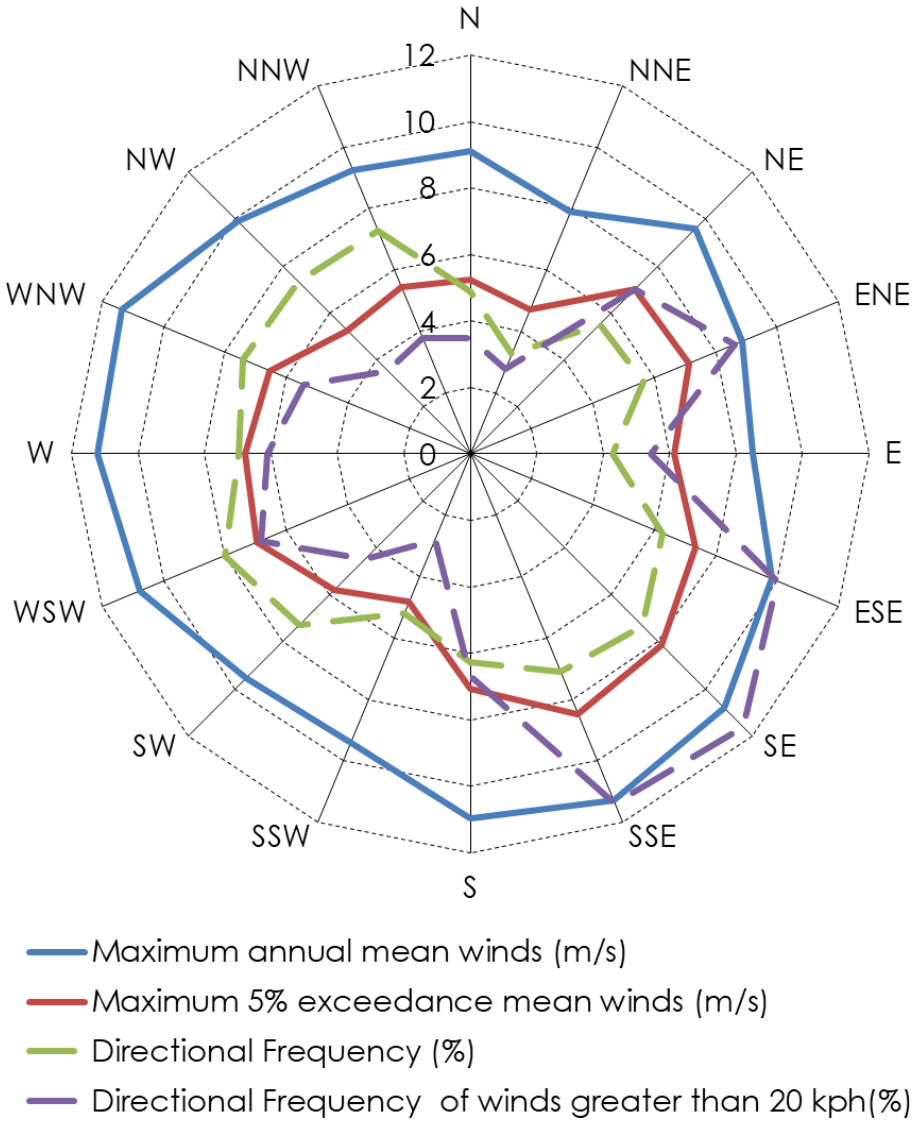

Figure 2: Directional Annual and 5% Exceedance Hourly Mean Wind Speeds (referenced to 10m height in standard open terrain), and Frequencies of Occurrence, for the Western Sydney Region

4 WIND EFFECTS ON PEOPLE

The acceptability of wind in any area is dependent upon its use. For example, people walking, or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Various other researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. Some Councils and Local Government Authorities have adopted elements of some of these into their planning control requirements.

For example, A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table 2 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

Table 2: Summary of Wind Effects on People (A.D. Penwarden, 1973)

Type of Winds	Beaufort Number	Mean Wind Speed (m/s)	Effects
Calm	0	Less than 0.3	Negligible.
Calm, light air	1	0.3 – 1.6	No noticeable wind.
Light breeze	2	1.6 – 3.4	Wind felt on face.
Gentle breeze	3	3.4 – 5.5	Hair is disturbed, clothing flaps, newspapers difficult to read.
Moderate breeze	4	5.5 – 8.0	Raises dust, dry soil and loose paper, hair disarranged.
Fresh breeze	5	8.0 – 10.8	Force of wind felt on body, danger of stumbling
Strong breeze	6	10.8 – 13.9	Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant.
Near gale	7	13.9 – 17.2	Inconvenience felt when walking.
Gale	8	17.2 – 20.8	Generally impedes progress, difficulty balancing in gusts.
Strong gale	9	Greater than 20.8	People blown over.

It should be noted that wind speeds affecting this particular development can only be accurately quantified with a wind tunnel study. This assessment addresses only the general wind effects and any localised effects that are identifiable by visual inspection and the acceptability of the conditions for outdoor areas are determined based on their intended use. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

5 RESULTS AND DISCUSSION

The expected wind conditions affecting the development are discussed in the following sub-sections of this report for the various outdoor areas within and around the subject development. The interaction between the wind and the building morphology in the area is considered and important features taken into account including the distances between the surrounding buildings and the proposed building form, as well as the surrounding landform. Note that only the potentially critical wind effects are discussed in this report and that the effect of any future developments is not considered. A glossary of the different wind effects described in this report included in Appendix A.

For this assessment, the wind speed criteria for pedestrian comfort that are considered are listed as follows:

- Walking Criterion (8m/s with a 5% probability of exceedance)
  for general circulation and pedestrian thoroughfares, e.g. footpaths, private balconies/terraces, through-site links etc.

- Standing (Short Exposure) Criterion (6m/s with a 5% probability of exceedance)
  for stationary activities generally less than an hour, e.g. waiting areas, communal terraces, main entries, café seating etc.

- Sitting (Long Exposure) (4m/s with a 5% probability of exceedance)
  for stationary activities longer than an hour, e.g. outdoor cinemas, outdoor fine dining etc.

Note that the above wind comfort levels are derived from the Lawson (1975) criteria. Although this assessment is qualitative in nature, the abovementioned criteria for pedestrian comfort are considered when assessing the wind environment impacts. However, all areas are also assessed with consideration to a pedestrian safety criterion of 23m/s for the annual maximum gust.

5.1 Lower Ground and Ground Level Areas

The pedestrian footpaths along the northern and eastern frontages at Ground level are primarily exposed to the direct impact and side-streaming effects of the north-easterly and south easterly winds as well as the downwash resulting from these winds impacting the façade. However, the setback of both buildings along the northern aspect of the site and the impermeable awnings along the eastern aspects are expected to limit the impact of the downwashing winds. Additionally, the extensive impermeable screening, planting and large trees adjacent to the footpath are expected to limit the remaining adverse wind effects and should therefore be retained allowing for suitable walking conditions. Similarly, the balconies and residential entryways will benefit from these elements ensuring conditions are suitable for private occupants.

The footpath along Hughes Avenue will be subject to similar wind effects albeit from the westerly winds. The wind conditions are expected to be suitable given the proposed awnings, setback of Building B and planting parallel to the footpath. Westerly and south-easterly winds may also accelerate around the southern corner of the podium, however conditions are expected to be suitable given the aforementioned design features and the access ramp being sufficiently recessed within the tower form. The proposed trees along the Hope Street footpath are also expected to ameliorate the side-streaming and direct winds from the south-easterlies.

As a general note, it is recommended that vegetation be densely foliating and evergreen in species with trees have interlocking canopies wherever possible to ensure effective wind mitigation during the winter months.

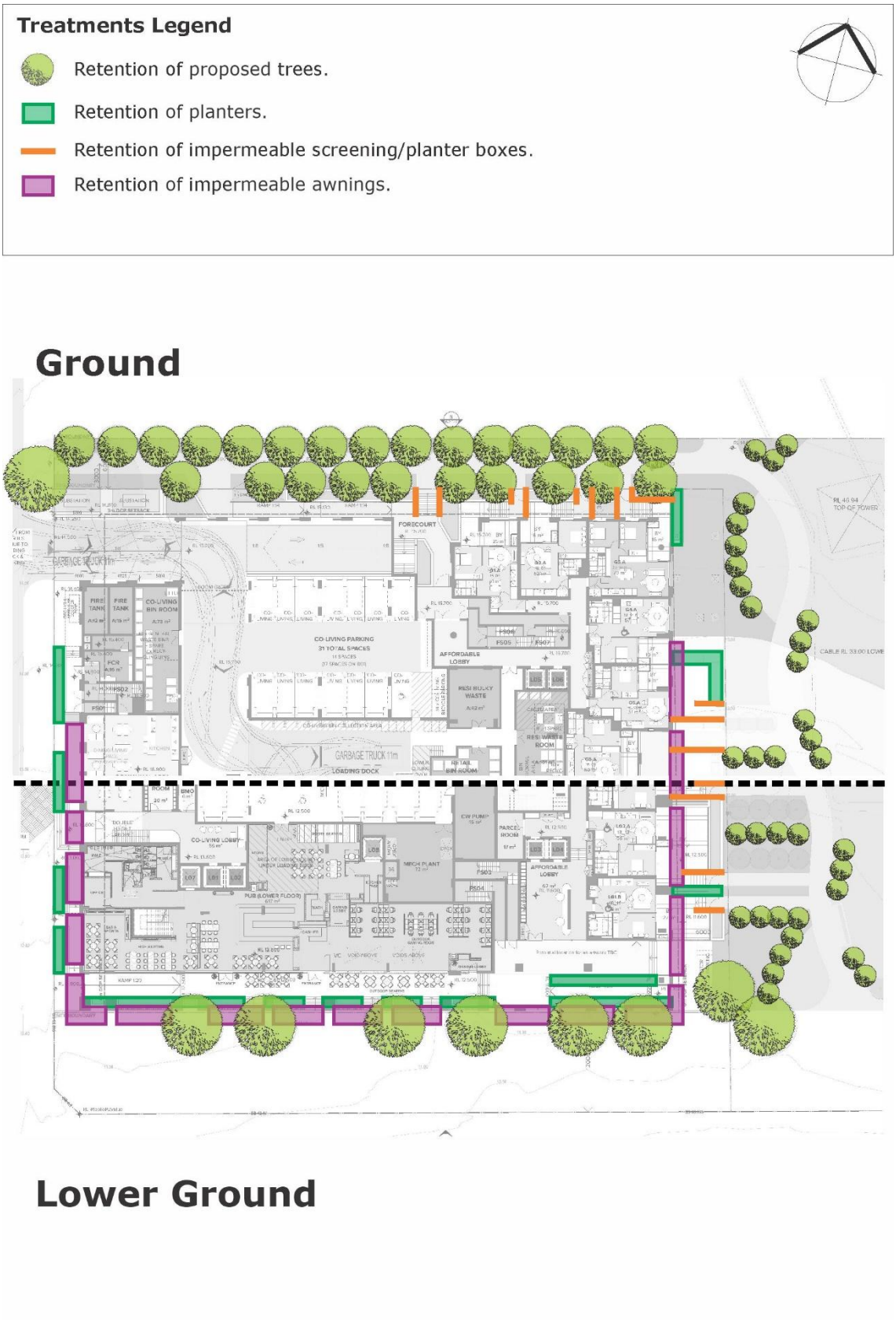

Figure 3: Recommended Treatment for the Lower Ground and Ground Level Areas

5.2 Communal Open Space

The Communal Open Space located on Level 01 will be subject all three prevailing winds despite being shielded to an extent by the buildings on either side. From the north-east, winds are expected to impact the northern area adjacent to Building B in the form of direct winds with downwash and side-stream effects as winds are captured by the northern façade of Building A. Additionally, some of these winds will accelerate around the western corner of Building A, funnelling south and exacerbating conditions within the communal space. South-easterly winds are well aligned with the orientation of the communal area and are expected to funnel between the two buildings as well. Retention of the awning above the northern entrance and extension of the screening along the staircase to 1.5m is recommended with a dense landscaping strategy of trees and planting.

Adverse wind phenomena are also expected from the westerly winds accelerating around the northern corner of Building B, flowing south-east. It is expected that Building B will provide a level of shielding from the direct effects of the westerly winds, with the remainder being captured by the Building A western façade resulting in downwash onto the southern area. Hence the proposed shade structure combined with the proposed trees and planting should be retained to accommodate standing conditions. The abovementioned treatments are shown in Figure 4 below.

The Level 15 communal space on Building A is also subject to all prevailing winds due to its level of exposure but incorporates significant trees and landscaping around the perimeter which are expected to shield this area from the direct impact and upwash wind effects. For the proposed vegetation to be effective as a wind mitigation device, they should be of a densely foliating and evergreen variety. The trees/planting should be spaced such that the foliage is able to interlock between plants (where possible) to ensure its effectiveness during stronger winds. Furthermore, retaining the 1.1m impermeable balustrade along the perimeter is expected to assist with limiting the oncoming winds before they filter through the vegetation. The abovementioned treatments are shown in Figure 4 below.

Figure 4: Recommended Treatment for the Communal Open Spaces (Levels 01 and 15)

5.3 Private Balconies and Courtyards

The majority of the balconies located on Levels 03 -16 for both buildings are expected to be suitable for their intended use due to the inclusion of various wind mitigation features such as their overall recessed design, impermeable intertenancy screens, and full-height impermeable end and corner screens.

Due to the exposure of Building A from east, the northernmost and easternmost corner balconies located on Ground to Level 02 may experience multiple adverse wind effects simultaneously. These corner balconies are especially subject to direct impact, downwash, side-streaming and corner accelerating wind effects resulting from the prevailing north-easterly and south-easterly winds impacting the façade. To mitigate the adverse effects, it is recommended that these balconies retain the full height screening at the corner aspects.

With these features retained in the final design, it is expected that wind conditions for the various balconies within development will be suitable for their intended uses.

6 REFERENCES

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Penwarden, A.D. (1973). "Acceptable Wind Speeds in Towns", Building Science, vol. 8: pp259–267.

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APPENDIX A WIND EFFECTS GLOSSARY

A.1 Downwash and Upwash Effects

The downwash wind effect occurs when wind is deflected down the windward face of a building, causing accelerated winds at pedestrian level. This can lead to other adverse effects as corner acceleration as the wind attempts to flow around the building, as seen in Figure A.1.

This can also lead to recirculating flow in the presence of a shorter upstream building, causing local ground level winds to move back into the prevailing wind.

The upwash effect occurs near upper level edge of a building form as the wind flows over the top of the building. This has the potential to cause acceleration of winds near the leading edge, as well as potentially reattaching onto the roof area. This effect causes wind issues particularly near the leading edges of tall building and on the rooftop areas if there is sufficient depth along the wind direction. Upwash is more apparent in taller towers and podia.

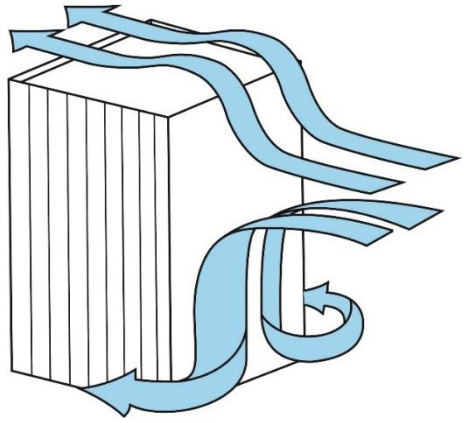

Figure A.1: Downwash Leading to Corner Wind Effect, and Upwash Effects

A.2 Funnelling/Venturi Effect

Funnelling occurs when the wind interacts with two or more buildings which are located adjacent to each other, which results in a bottleneck, as shown in Figure A.2. This causes the wind to be accelerated through the gap between the buildings, resulting in adverse wind conditions and pedestrian discomfort within the constricted space. Funnelling effects are common along pedestrian links and thoroughfares generally located between neighbouring buildings that have moderate gaps between them.

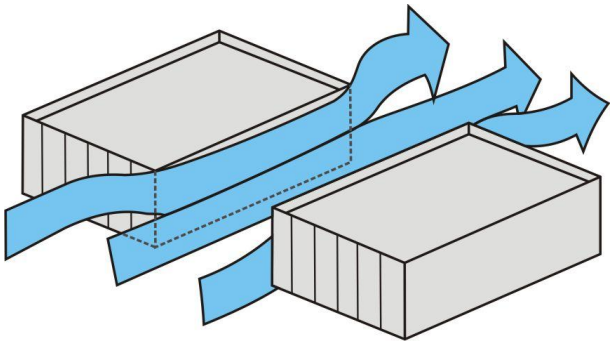

Figure A.2: Funnelling/Venturi Wind Effect

A.3 Gap Effect

The gap effect occurs in small openings in the façade that are open to wind on opposite faces, as seen in Figure A.3. This can involve a combination of funnelling and downwash effects. Presenting a small gap in the façade on the windward aspect as the easiest means through which the wind can flow through can result in wind acceleration through this gap. The pressure difference between the windward façade and the leeward façade also tends to exacerbate the wind flow through this gap.

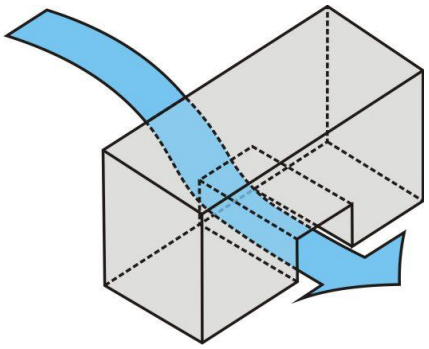

Figure A.3: Gap Wind Effect

A.4 Sidestream and Corner Effects

The sidestream effect is due to a gradual accumulation of wind shearing along the building façade that eventuates in an acceleration corner effect. The flow is parallel to the façade and can be exacerbated by downwash effects as well, or due to corner effect winds reattaching on the façade.

This is shown in Figure A.4. The corner refers to the acceleration of wind at the exterior vertical edge of a building, caused by the interaction of a large building massing with the incident wind, with the flow at the corner being accelerated due to high pressure differentials sets up between the windward façade and the orthogonal aspects. It can be further exacerbated by downwash effects that build up as the flow shears down the façade.

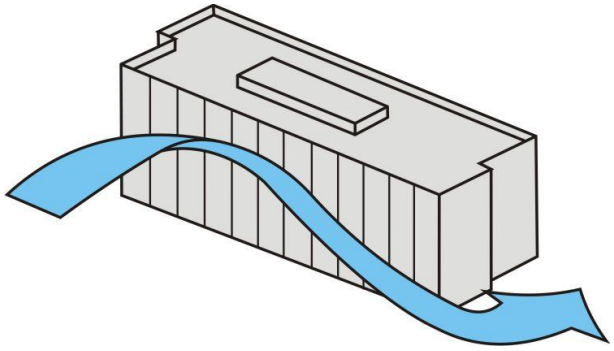

Figure A.4: Sidestream and Corner Wind Effect

A.5 Stagnation

Stagnation in a region refers to an area where the wind velocity is significantly reduced due to the effect of the flow being impeded by the bluff body. For a particular prevailing wind direction, this is typically located near the middle of the windward face of the building form or over a short distance in front of the windward face of a screen or fence. Concave building shapes tend to create an area of stagnation within the cavity, and wind speeds are generally low in these areas.