



PEDESTRIAN WIND ENVIRONMENT STATEMENT

3B-11 LOFTUS STREET, 1-7 BURTON STREET & 10-12 GIPPS STREET, CONCORD

WK180-01F02(REV2)- WS REPORT

JANUARY 16, 2026

Prepared for:

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DOCUMENT CONTROL

Date	Revision History	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
October 20, 2025	Initial.	0	LA	AD	AS
December 12, 2025	Updates to reflect minor design changes.	1	LA	AD	AS
January 12, 2026	Updates to reflect drawings received January 7, 2026.	2	LA	AD	AS
January 16, 2026	Minor update to Ground Level treatments.	3	AS	AD	AS

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EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the proposed three-tower development located at the intersection of Gipps, Loftus, and Burton Street, Concord, 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 and landscaping drawings (received January 7, 2026). 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:

- Ground Level areas
 - Retain all existing street trees and proposed landscaping (per the landscaping drawings) along the pedestrian footpaths.
 - Retain the proposed tree planting (per the landscaping drawings) in the area between the two north and south towers.
 - Introduce 1.5-2m high impermeable screens at the corners of the development which should protrude at least 1m from the main façade.
- North tower podium
 - Retain all of the proposed landscaping within and around the podium area (per the landscaping drawings).
 - Introduce 1.5m high impermeable perimeter impermeable balustrades along the northern and southern aspects of this terrace.

- Level 4, South tower
 - Retain 1.8m high impermeable perimeter balustrades around the entire western terrace.
 - Retain 1.5m high impermeable perimeter balustrades around the eastern mid-façade terrace.
 - Introduce 1.5m high impermeable screens at the south-western, and north-western corners of the Level 4 tower form (i.e. adjacent to the lounge and private dining areas).
 - Retain the impermeable wraparound awning over the western aspect of the terrace, which extends 5m from the western façade line.

- Level 27, South tower
 - Introduce 2-3m high impermeable perimeter screen around the terrace perimeter.

- Private balconies and terraces
 - Retain the full height impermeable dividing walls between terraces on the Ground Level.
 - Introduce 1.2m height impermeable dividing screens between terraces on the northern aspect of the northern tower on the Ground Level.
 - Introduce an impermeable awning over western aspect private terraces on the north tower Ground Level, which extends 3m from the façade line.
 - Introduce a 1.5m high impermeable balustrade on the shorter aspect of corner balconies – note that standard height impermeable balustrades should be retained on all other balconies across the development.
 - Introduce 2-3m high impermeable screens around the perimeter of private terraces on Level 27 of the north tower.

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. Note that wind tunnel testing is expected to be undertaken in the near future, which will allow for a quantitative assessment of the pedestrian wind environment within and around the development and thus the optimisation of treatments as required.

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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.

DESCRIPTION OF DEVELOPMENT AND SURROUNDINGS

The site is located bounded by Gipps Street to the north, Loftus Street to the east, and Burton Street to the south. The buildings surrounding the site are a mixture of low rise residential and commercial buildings. Note that the near the site are open fields to the north and east (the resulting lack of surface roughness may exacerbate the effect of the prevailing winds).

A survey of the land topography indicates a gradual downwards slope towards the east.

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 environment consists of number of 1-2 storey residential building lots. The proposed development consists of three residential towers which are 13, 29 and 30 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 including public footpaths.
- Communal areas on podiums of the north and south towers.
- Communal area on Level 27 of the south tower.
- Private balconies and terraces.

Legend

- Line thickness represents the magnitude of the regional wind from that direction
- Line length represents the frequency that the regional wind occurs for that direction

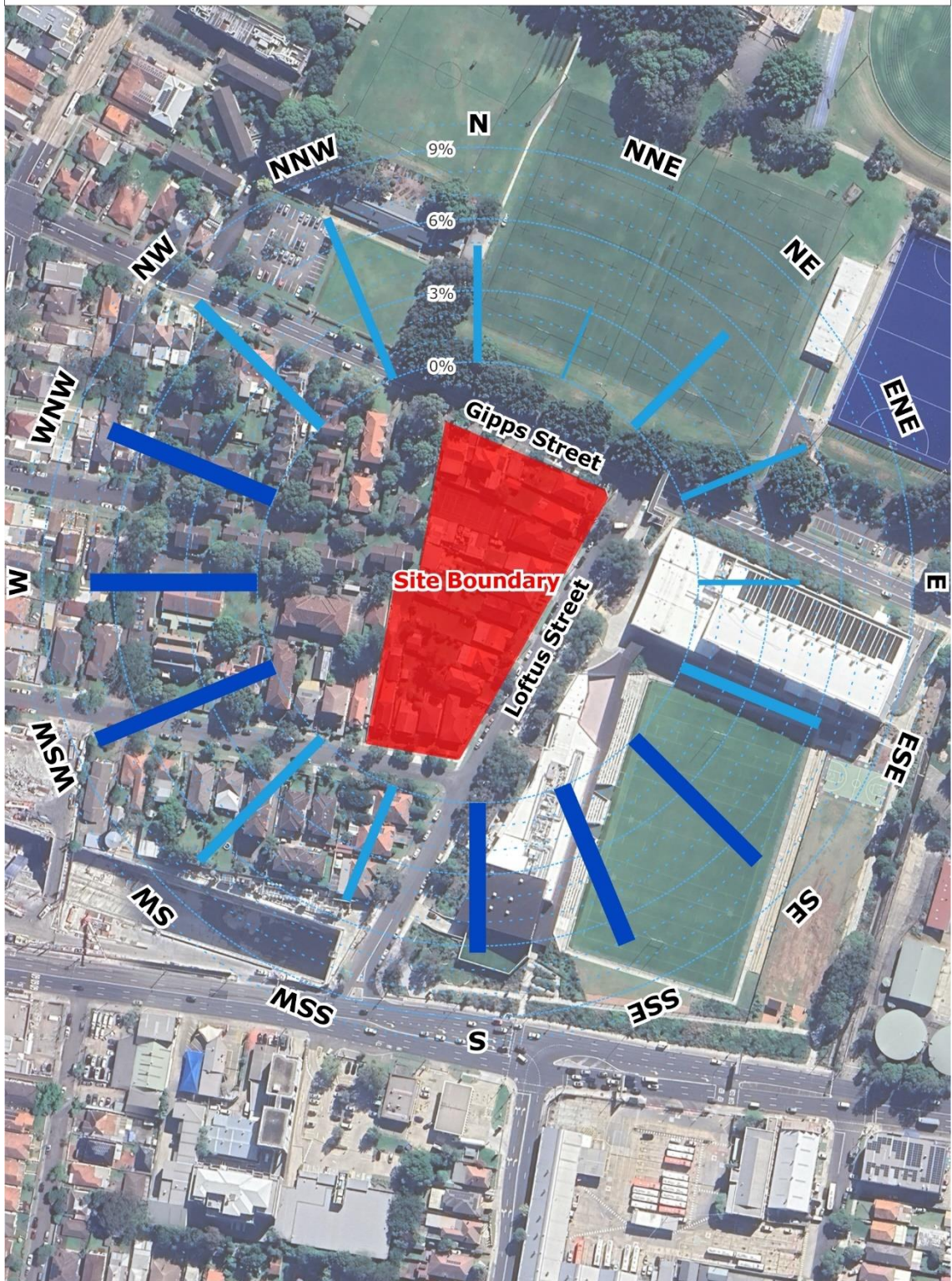


Figure 1: Aerial Image of the Site Location and Prevailing Wind Directions

3 REGIONAL WIND

The Bankstown 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.

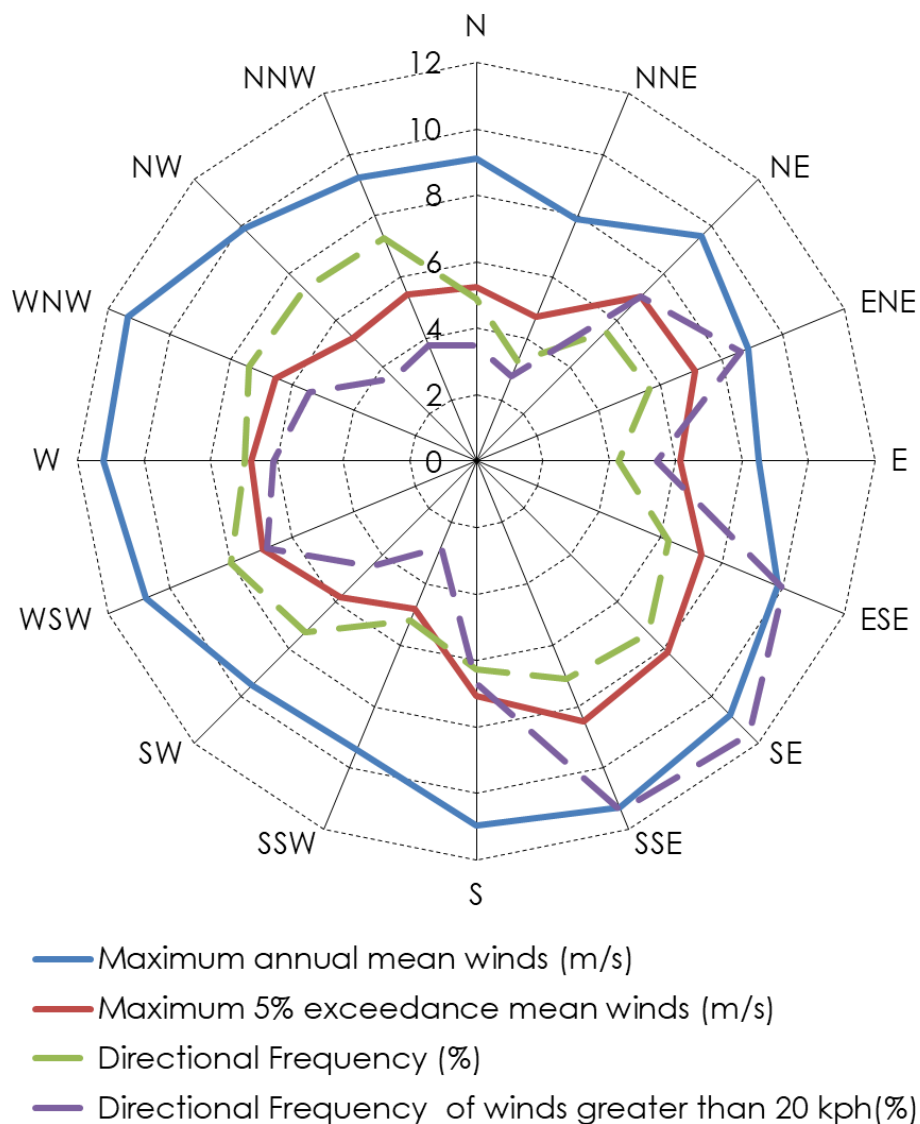


Figure 2: Directional Annual and 5% Exceedance Hourly Mean Wind Speeds (referenced to 10m height in standard open terrain), and Frequencies of Occurrence, for the Bankstown Region

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 1 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 1: 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.

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. 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.

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 Ground Level Communal and Public Areas

The pedestrian footpaths around the development are exposed to the following prevailing winds which are expected to sidestream along the development:

- Gipps Street: All prevailing wind directions.
- Loftus Street: Prevailing north-easterly and south-easterly winds. Regarding the prevailing westerly winds, it is possible that the wake behind the north towers induces pressure-driven effects, causing the prevailing westerlies to be diverted along Loftus Street.
- Burton Street: All prevailing wind directions.

As such, the following is recommended to mitigate this adverse sidestreaming:

- Retain all existing street trees and proposed landscaping (per the landscaping drawings) along the pedestrian footpaths.

For landscaping to be effective as a wind mitigation device, it should be of a densely foliating and evergreen variety, and the planting should be spaced such that the foliage is able to interlock between plants where possible.

The prevailing winds are also expected to corner accelerate around the various building corners, as well as funnel between the north and south towers. As such, the following is recommended:

- Retain the proposed tree planting (per the landscaping drawings) in the area between the two north and south towers.

However, there are some areas for which landscaping may not be sufficient as a treatment. Specifically, the prevailing north-easterly and south-easterly winds are expected to corner accelerate around the north-eastern and south-eastern corners of both towers, and sidestream along the eastern façade, along the lobby entrances and areas that may be activated in the future for seating use (per the landscaping drawings). As such, it is recommended to:

- Introduce 1.5-2m high impermeable screens at the corners of the development (refer to Figure 3) which should protrude at least 1m from the main façade.

5.2 Communal Open Spaces

5.2.1 North Tower Podium

The prevailing north-easterly and south-easterly winds are expected to funnel into the communal terrace between the two north towers. There is also some potential for the prevailing westerly winds to be diverted into this area through pressure-driven effects. As such, it is recommended to:

- Retain all of the proposed landscaping within and around the podium area (per the landscaping drawings).
- Introduce 1.5m high impermeable perimeter balustrades along the northern and southern aspects of this terrace (refer to Figure 4).

5.2.2 Level 4, South Tower

Trafficable areas on all four aspects of the communal area on Level 4 of the south tower are exposed to sidestreaming of all prevailing winds. This is expected to also induce accelerated flows near the south-western and north-western corners of the Level 4 tower form (i.e. adjacent to the lounge and private dining areas).

- Retain 1.8m high impermeable perimeter balustrades around the entire western terrace.
- Retain 1.5m high impermeable perimeter balustrades around the eastern mid-facade terrace.
- Introduce 1.5m high impermeable screens at the south-western, and north-western corners of the Level 4 tower form (i.e. adjacent to the lounge and private dining areas).

Additionally, due to its alignment with the westerly winds, downwash off the western aspect of the south tower is expected to impact the western areas of the terrace. As such, it is recommended to:

- Retain the impermeable wraparound awning over the western aspect of the terrace, which extends 5m from the western façade line.

5.2.3 Level 27, South Tower

The prevailing north-easterly and south-easterly winds are expected to sidestream along the northern, eastern, and southern aspects of the terrace, and accelerate near the north-eastern and south-eastern corners of the terrace. The westerly winds are expected to sidestream along the northern and southern terrace aspects, and accelerate around the south-eastern corner of the terrace. As such, it is recommended to:

- Introduce 2-3m high impermeable perimeter screen around the terrace perimeter (refer to Figure 8).

5.3 Private Balconies and Courtyards

The majority of the balconies of the development are expected to be suitable for their intended use due to the inclusion of various wind mitigation features such as their overall recessed design, and standard height impermeable balustrades. These features should be retained in the final design.

The private terraces on the ground level on the western aspect of the north tower are expected to experience downwashing from the prevailing westerly winds, and sidestreaming from the prevailing north-easterly and south-easterly winds. The terraces at the north-western and south-western corners may also experience some corner acceleration induced by the prevailing north-easterly and south-easterly winds. It is therefore recommended to (refer to Figure 3):

- Retain the full height impermeable dividing walls between terraces.
- Introduce an impermeable awning over these terraces, which extends 3m from the façade line.

Similarly, the ground level terraces on the northern aspect of the northern tower are expected to experience side streaming from the prevailing north-easterly and westerly winds, and accelerated flows at the north-eastern terrace induced by the prevailing north-easterly and south-easterly winds. As such, for these areas it is recommended to:

- Introduce 1.2m height impermeable dividing screens (refer to Figure 3).

Note that all corner balconies across the development are expected to experience corner acceleration from the prevailing north-easterly, south-easterly or westerly winds. As such, it is recommended to:





- Introduce a 1.5m high impermeable balustrade on the shorter aspect of these balconies (refer to Figures 4, 5, 6, and 7) – note that standard height impermeable balustrades should be retained on all other balconies across the development.

The Level 27 private terraces on the eastern aspect of the north tower are exposed to all of the prevailing winds. Specifically, the north-easterly and south-easterly winds are expected to sidestream across the terraces. Therefore, it is recommended to:

- Introduce 2-3m high impermeable screens around the perimeter of these terraces (refer to Figure 8).

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.

Treatments Legend

-  Impermeable awning.
-  1.5-2m high impermeable screen.
-  Retain full height impermeable dividing walls.
-  Introduce 1.2m high impermeable dividing screens.



Note: All proposed landscaping and existing street trees should be retained as per the landscaping drawings received January 7, 2026 ensuring that vegetation is densely foliating and of an evergreen variety.



Figure 3: Recommended Treatments for the Ground Level

Treatments Legend

— 1.5 high impermeable balustrade.

Note: All proposed landscaping and existing street trees should be retained as per the landscaping drawings received January 7, 2026, ensuring that vegetation is densely foliating and of an evergreen variety.

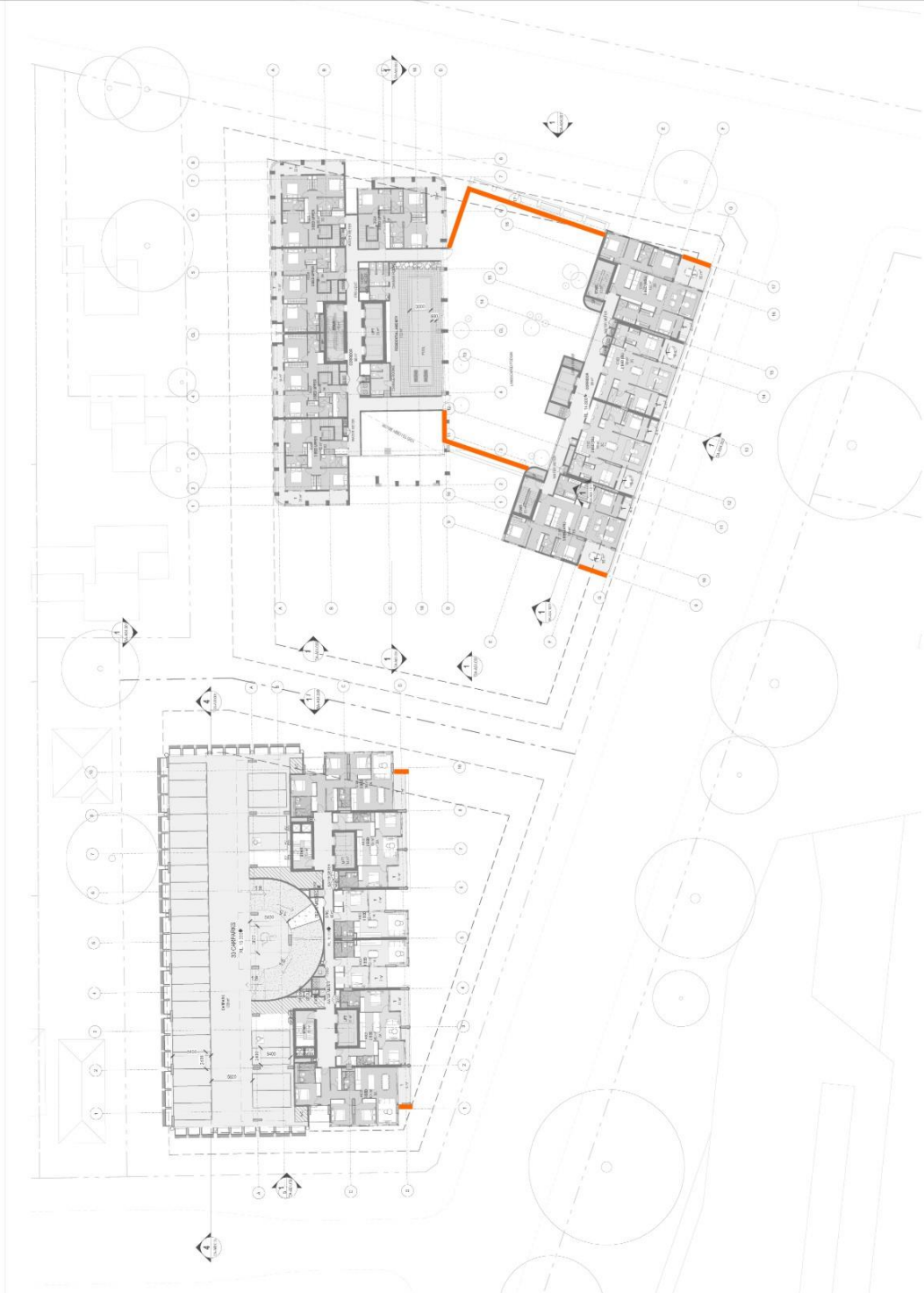


Figure 4: Recommended Treatments for the Podium (North Towers)

Treatments Legend

— 1.5m high impermeable balustrade.

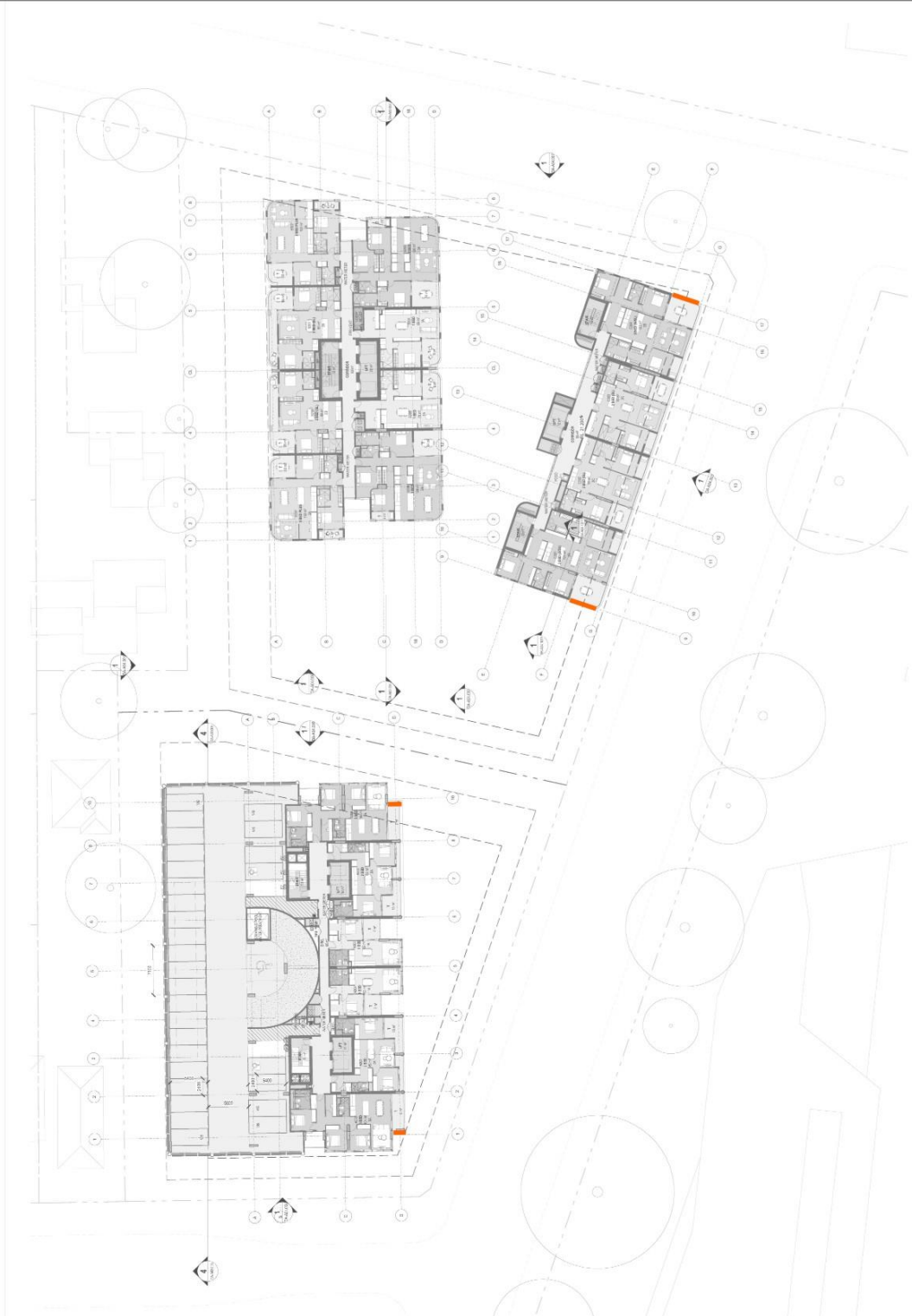






Figure 5: Recommended Treatments for Levels 1-3

Treatments Legend

-  Retain impermeable awning.
-  Retain 1.8m high impermeable screen/balustrade.
-  Retain 1.5m high impermeable screen/balustrade.
-  1.5m high impermeable screen/balustrade.

Note: All proposed landscaping and existing street trees should be retained as per the landscaping drawings received January 7, 2026, ensuring that vegetation is densely foliating and of an evergreen variety.

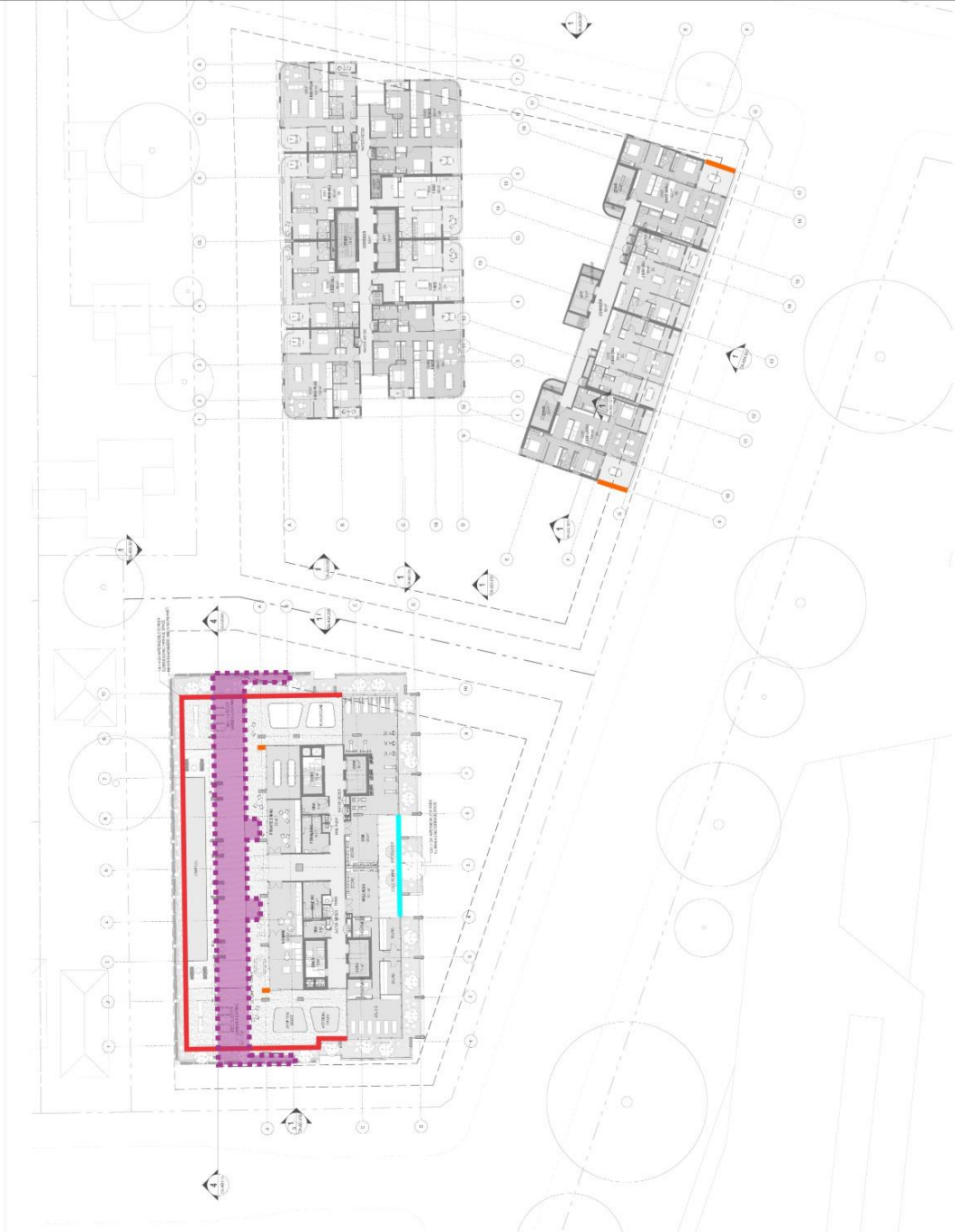


Figure 6: Recommended Treatments for Level 4

Treatments Legend

— 1.5 high impermeable balustrade.



Figure 7: Recommended Treatments for the Typical Levels

Treatments Legend

— 2-3m high impermeable screen.

Note: All proposed landscaping and existing street trees should be retained as per the landscaping drawings received January 7, 2026, ensuring that vegetation is densely foliating and of an evergreen variety.



Figure 8: Recommended Treatments for Level 27

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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.

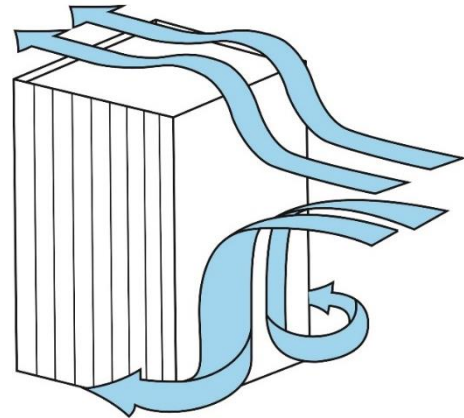


Figure A.1: Downwash Leading to Corner Wind Effect, and Upwash Effects

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.

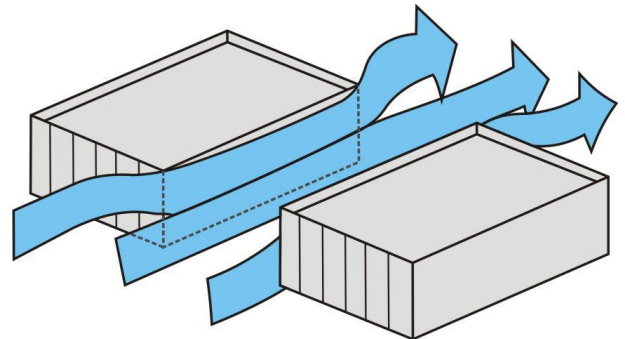


Figure A.2: Funnelling/Venturi Wind Effect

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.

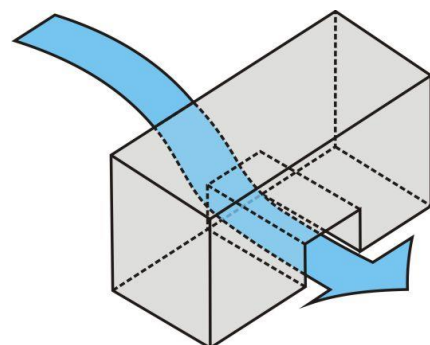


Figure A.3: Gap Wind Effect

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.

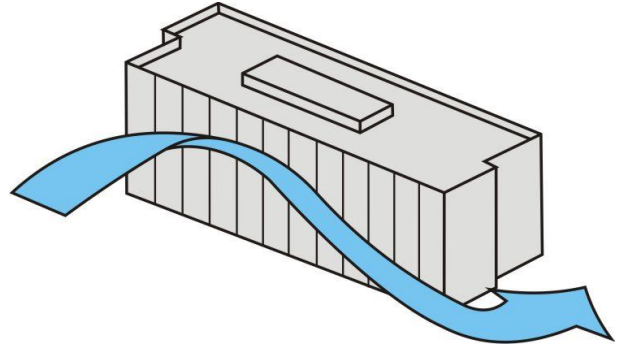


Figure A.4: Sidestream and Corner Wind Effect

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.