WATERLOO COLLECTIVE | mirvac JOHN HOLLAND

WATERLOO METRO QUARTER OVER STATION DEVELOPMENT

Environmental Impact Statement
Appendix I – Wind Impact Assessment

SSD-79307746 Central Precinct
SSD-79307758 Northern Precinct

Detailed State Significant
Development Application

Prepared for **WL Developer Pty Ltd**

September 2025

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
1	Initial	12 September 2025	RL	AMC / MJP
2	Updated Draft	18 September 2025	RL	AMC / MJP
3	Final – SSDA Submission	24 September 2025	RL	MJP

NOTE

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.

EXECUTIVE SUMMARY

This report has been prepared by RWDI Australia Pty Ltd (RWDI) on behalf of WL Developer Pty Ltd (the applicant) to accompany State Significant Development Applications (SSDA) for Waterloo Metro Quarter (WMQ) located at 150 Cope Street, Waterloo (the site). This report responds to the detailed Central Precinct SSD (SSD-79307746) and the detailed Northern Precinct SSD (SSD-79307758). The report presents the findings of a pedestrian-level wind microclimate assessment conducted for the Site for the following development configurations:

Existing Configuration:	Existing site with existing surrounding buildings;
Proposed Configuration:	Proposed Development with existing surrounding buildings.

The pedestrian level wind conditions within and around the proposed development were predicted using the results from a boundary-layer wind tunnel test combined with historical meteorological wind records for the region. The wind speeds have been evaluated against the Pedestrian Wind Criteria within the Waterloo Metro Design Quality Guidelines.

The results of the test can be summarised as follows:

Pedestrian Wind Safety

In the existing configuration wind speeds exceeded safety limits at two points along Cope Street to the north due to the interaction of westerly winds interacting with the Marton Building. These exceedances persist in the Proposed Configuration with an additional marginal exceedance at the eastern end of the Church Square. All other ground-level and elevated areas were observed to meet the safety criteria.

Pedestrian Wind Comfort

Most ground-level areas across the existing site are suitable for standing to walking use year-round, with some locations suitable for sitting use to the east and north of the development site. Two locations were observed to have uncomfortable wind conditions located along Cope Street opposite the Marton Building and at the north-western corner of the Waterloo Congregational Church. Wind conditions within the surrounding streets of the site generally range from sitting to standing use along the northern half of the site. Along the southern portions of Cope Street and Botany Road, wind conditions were observed to generally satisfy walking criteria.

In the Proposed configuration the overall wind comfort levels on the ground level areas align well with the requirements of Waterloo Metro Design Quality Guidelines. Wind conditions at the majority of ground level areas within and around the Proposed Development were observed to range from standing to walking use throughout the year. Wind conditions around key entrances, within Cope Street Plaza and along Raglan Walk are expected to satisfy the standing comfort criteria with recessed areas around Building 2 suitable for sitting use. Wind conditions exceeding the walking comfort criteria are located at the north-western corner of Building 1 along Botany Road, at the south-eastern corner of Building 1 along Raglan Walk and Grit Lane, and at the south-eastern corner of Building 2.

Elevated locations above ground within the Proposed Development were found to be predominantly suitable for passive activities. The various terrace areas were found to have localised areas which were suitable for walking use due to their exposure at open corners or funnel prone spaces. The private terraces on the podium rooftop area of Level 4 of Building 1 were found to satisfy the sitting and standing criteria, while the majority of private balconies of Building 1 were also all found to be suitable for passive use throughout the year, ranging from sitting to standing use.

Wind Mitigation Studies

Based on the findings of the wind tunnel study, additional wind tunnel testing has been undertaken with the inclusion of the following elements:

- **Mitigation – Safety Configuration:**
  - Porous balustrades within Church Square.
  - 2 m high impermeable wall at the Church Square corridor, representative of a 1 m high impermeable balustrade atop a vertical step terrain change.
- **Mitigation – Comfort Configuration:**
  - Porous balustrades at the Church Square corridor.
  - 2m high impermeable wall at the Church Square corridor, representative of a 1 m high impermeable balustrade atop a vertical step terrain change.
  - Landscaping including densely foliating tree and shrub planting throughout site along ground and elevated terraces as well as existing street trees.

With the inclusion of the screening elements tested in the Safety Configuration, the safety exceedance at the eastern end of Church Square is mitigated and comfort conditions improved within the corridor. Based on the effectiveness of this tested configuration it is expected that height of the vertical wall element can be reduced to a 1.5 m tall vertical step comprised of a 0.6 m vertical terrain step with an impermeable 0.9 m high back rest along a bench which has been incorporated into the proposed landscape design. With the addition of landscaping all uncomfortable wind conditions were mitigated and the comfort conditions at all locations were significantly improved. The majority of ground level and elevated areas satisfy the sitting or standing criteria throughout the year, while a relatively small number of locations satisfy the walking criteria.

Wind Mitigation Strategies

Based on the findings of the wind tunnel study, the following in-principle wind mitigation measures should be incorporated in the design to improve local wind conditions to within targeted criteria:

Ground:

- **Grit Lane:** Porous balustrade elements (50% porosity) can be incorporated along the raised seating area. Localised perpendicular wind screens running north-south within the raised seating areas along Grit Lane are recommended to be included. Tree planting atop the northern Level 2 green roof of Building 2 is also recommended.

Above-Ground:

- **Building 2 Level 3 Terrace:** Include impermeable balustrading around the proposed sitting areas at the west and south-eastern corner. Alternatively, the density and height of the perimeter planting around these spaces can be increased.

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1 INTRODUCTION

This report has been prepared by RWDI Australia Pty Ltd (RWDI) on behalf of WL Developer Pty Ltd (the applicant) to accompany a State Significant Development Application (SSDA) for the detailed Central Precinct SSD (SSD-79307746) and Northern Precinct SSD (SSD-79307758), located within the Waterloo Metro Quarter (WMQ) at 150 Cope Street, Waterloo. This SSD will replace the previous detailed approval applying to the Central and Northern precincts.

This report has been prepared to respond to Item 6 of the Planning Secretary's Environmental Assessment Requirements (SEARs) issued by Department of Planning, Infrastructure and Housing (DPHI) on 13 February 2025, the relevant advice by the City of Sydney (CoS) on 3 February 2025, and the relevant advice raised by the State Design Review Panel (SDRP) on 10th July 2025.

The figure below indicates the land to which this DA applies in relation to the overall WMQ site (shaded in Green and Purple).

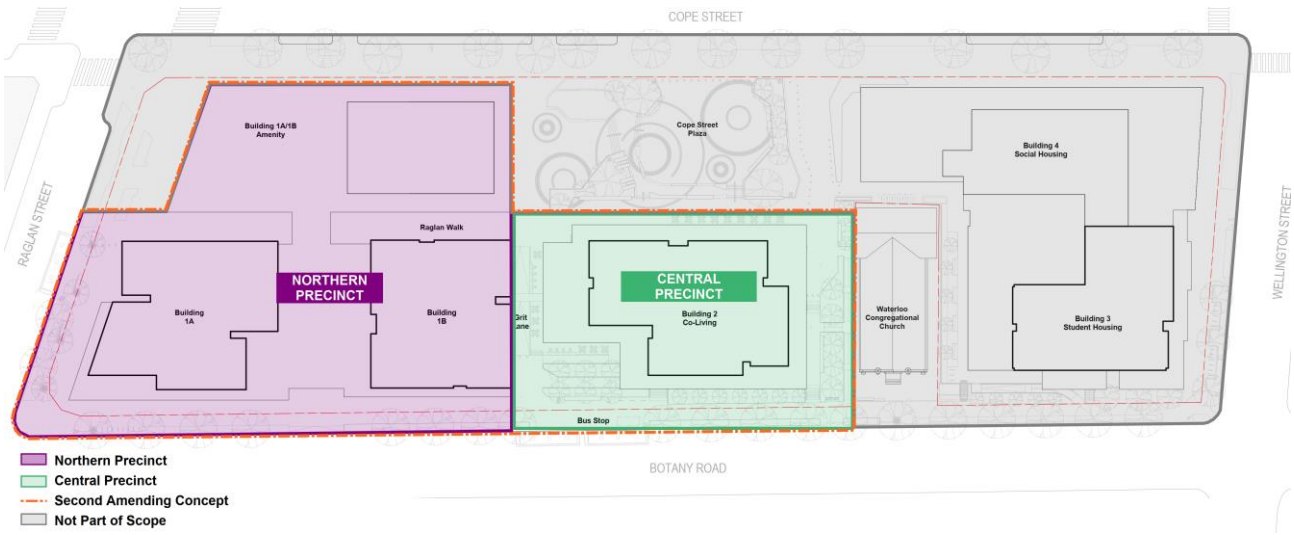

Image 1 Land to which Scoping Reports Apply

Central Precinct

This application seeks consent for the design, construction and operation of a 26 storey (including plant level) mixed use building within the Central Precinct (the site) of the WMQ estate. The proposal comprises a Co-living housing tower above a three storey podium containing retail and community facility in the form of a childcare centre. Specifically, the proposal comprises:

- Ground level retail tenancies, community facility, and childcare, co-living and shared basement access lobbies
- Community centre in the form of a childcare centre at Level 1 and Level 2
- A Co-living housing tower from Levels 3 to 24 comprising:
    - Self-contained co-living accommodation rooms across 20 levels, with capacity for around 500 rooms

    - Indoor and outdoor communal amenity at Levels 3 and 24
    - Communal space also provided on each accommodation level;
- Ground level vehicular access from Church Square shared zone to the shared basement, delivery of a pedestrian thoroughfare through the site, landscaping and public domain works.
- Indicative building signage zones

Northern Precinct

This application seeks consent for the design, construction and operation of a mixed use development within the Northern Precinct (the site) of the WMQ site.

The proposal comprises a 4 storey retail and commercial podium, with two residential towers above. The two buildings have a total height of 29 storeys and 26 storeys (including plant). Specifically, the proposal comprises:

- A podium containing:
    - Vehicle entrance and loading dock facilities accessed off Botany Road;
    - Ground level retail tenancies, commercial and residential lobbies,
    - Three levels of commercial office floorspace, totalling around 5,000sqm
- Two residential apartment towers with a total of 314 units, including 39 affordable housing units and 275 market units,
    - Building 1A: 24 residential storeys (top of plant approx. RL116.9)
    - Building 1B: 21 residential storeys (top of plant approx. RL 107.5)
    - Communal open space located on the roof of the Metro box connected to Northern Precinct via a bridge link over Raglan Walk
- Delivery of a pedestrian thoroughfare through the site, landscaping and public domain works.
- Indicative building signage zones

This application is submitted for concurrent assessment with a DA to amend the Waterloo Metro Over Station Development (OSD) Concept DA (SSD 9393) (the Concept DA) - referred to as the Second Amending Concept DA. The Second Amending Concept DA seeks consent to modify the existing concept approval as it relates to the Northern and Central Precincts, by amending the building envelopes to redistribute floor space to suit a new mix of land uses. These Central and Northern Precinct SSDAs will be consistent with the Concept DA as amended.

Separately, a Section 4.55 Modification Application to modify the approved detailed Basement SSDA (SSD-10438), will be concurrently submitted with this application.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 13 February 2025 and issued for the Central Precinct SSD (SSD-79307746) and Northern Precinct SSD (SSD-79307758). Specifically, this report has been prepared to respond to the SEARs requirement issued below.

Table 1: SEARs Compliance Table

SEARs Request	Response / Location in Report
Item 6 - Environmental Amenity • Address how good internal and external environmental amenity is achieved, including access to natural daylight and ventilation, pedestrian movement throughout the site, access to landscape and outdoor spaces. • Assess amenity impacts on the surrounding locality, including lighting impacts, reflectivity, solar access, visual privacy, view loss and view sharing, overshadowing and **wind 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 summer and winter solstice and spring and autumn equinox) at hourly intervals between 9am and 3pm, when compared to the existing situation and a compliant development (if relevant). • For applicable developments, provide an assessment of the development against the Housing SEPP and the Apartment Design Guide.	Sections 3.2.2 & 3.3.2 discuss the wind safety and comfort exceedances within the site for the proposed amended development.

Item 8 - Public Space
• 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.
• Demonstrate how the development:
  ○ ensures that public space is welcoming, attractive and accessible for all.
  ○ 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.
• Address how Crime Prevention through Environmental Design (CPTED) principles are to be integrated into the development, in accordance with Crime Prevention and the Assessment of Development Applications Guidelines.
	Section 3.4 and Section 3.5 detail the effect of tested mitigations and recommendations to ameliorate wind impacts.

Prior to the granting of the SEARs, the City of Sydney offered its advice on Request for SEARs, advice for both the Northern and Central Precinct SSDs being provided in letters dated 3 February 2025. The advice relevant to wind is as follows:

Table 2: City of Sydney's Design Advice

CoS Design Advice	Response / Location in Report
Wind • The EIS must demonstrate how the proposed amended development will achieve the wind safety and comfort criteria established in the Design Guidelines. • The EIS is to include a wind assessment (based on wind tunnel testing) identifying the impact of the proposal on surrounding wind conditions, including at street level, publicly accessible places and useable rooftop spaces. Any mitigation measures required to ameliorate wind impacts are to be detailed. • Draft DCP changes are currently on exhibition which seek to amend the wind effects provisions in Section 3.2.7. The application should be required to assess the potential wind impacts utilising these requirements as a benchmark	Sections 3.2.2 & 3.3.2 discuss the wind safety and comfort exceedances within the site for the proposed amended development. Section 3.4 and Section 3.5 detail the effect of tested mitigations and recommendations to ameliorate wind impacts.

The State Review Design Panel (SDRP) also offered its advice for both the Northern and Central Precinct SSDs, as provided in a letter dated 10th July 2025. The advice relevant to overshadowing is as follows:

Table 3: State Design Review Panel's Design Advice

SDRP Design Advice	Response / Location in Report
Site strategy and built form There is still a concern that the wind conditions created at the corner of Raglan Street and Botany Road are unsuitable for its use as a busy thoroughfare and waiting zone for the pedestrian crossing. 3. In addition to the proposed continuous awning, incorporate further design solutions to achieve a standing level of comfort in this corner, as stipulated in the design guide.	Section 3.4.2 shows the wind conditions at the corner of Raglan Street and Botany Road satisfies the standing criteria with the inclusion of proposed landscaping.
Landscape The wind conditions indicated between towers 1A and 1B on the podium rooftop are generally unsuitable for dwell spaces. 22. Pursue design solutions to improve wind outcomes in this area or revise the landscape design to be more suited to its role as a transitional zone and provide visual amenity	Section 3.3.2 discusses comfort conditions at the podium rooftop areas of Building 1 including the area between towers 1A and 1B. Section 3.4.2 shows the effect of the proposed landscaping within these areas and demonstrates spaces suitable for passive activities.

This report has also been prepared in response to the following conditions of consent issued for the concept SSD DA (SSD 9393) for the OSD as summarised in the table below.

Table 4: Conditions of Concept Approval

Item	Description of Requirement	Response / Location in Report
B13 – Wind Impact Assessment	Future development applications for aboveground works shall be accompanied by a Wind Impact Assessment including computer modelling of detailed building form and demonstrating compliance with the criteria in Pedestrian Wind Environment Study by Windtech dated September 2019.	Section 3.5.1 details the level of compliance with the criteria as per the Waterloo Metro Design Quality Guidelines and outlines methods to achieve requirements.
B14 – Wind Impact Assessment	The Wind Impact Assessment must consider the locations of future and existing pedestrian crossings and apply standing criteria zones to match the width of crossings and the waiting zones of crossings, including on the opposite side of streets.	Section 3.5.1 includes assessment of pedestrian crossing waiting areas against the standing criteria.

This report has also been prepared in response to the requirements of the Waterloo Metro Design Quality Guidelines section 3G Wind.

Table 5: Waterloo Metro Design Quality Guidelines

Item	Description of Requirement	Response / Location in Report
3G Wind	Mitigate wind impacts on the public domain and achieve the following targets: • At least 50% of the publicly accessible open space meets the wind comfort standard for sitting. Outdoor dining and casual seating areas should correspond with these areas. • Waiting areas at bus stops and pedestrian crossings is to meet the wind comfort standard for standing. • Development must not exceed the wind safety standard of 24m/s (gust - 0.1% exceedance).	Section 3.5.1 details the level of compliance with the criteria as per the Waterloo Metro Design Quality Guidelines including assessments for 50% of publicly accessible open space to meet sitting and for waiting areas to meet standing. This section also outlines methods to achieve the targets of the guidelines.

2 BACKGROUND

2.1 Wind Tunnel Study Model

To assess the wind environment within and around the Proposed Development, a 1:300 scale model of the project site and surroundings was constructed for the wind tunnel tests of the following configurations:

Existing Configuration:	Existing site with existing surrounding buildings (Image 2A)
Proposed Configuration:	Proposed development with existing surrounding buildings (Image 2B)

The wind tunnel model included all relevant surrounding buildings and topography within a radius of 360m around the project site. This encompassed both existing structures and those currently under construction, with an expectation that these would likely be present or completed by the time the proposed subject development concludes. Additionally, the wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were simulated in RWDI's wind tunnel, incorporating spires and roughness blocks.

The wind tunnel model was instrumented with 131 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 1.5m above local ground in pedestrian areas throughout the study site. The placement of wind measurement sensors was based on our experience and understanding of the pedestrian usage for this site. Wind speeds were measured for 36 directions in 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model.

Note that no vegetation was included as part of the configurations tested in accordance with AWES Guidelines (2024). The method for testing scale models in the wind tunnel is consistent with internationally recognised good practice, and meets the requirements set out in the Australasian Wind Engineering Society Quality Assurance Manual (AWES-QAM-2019).

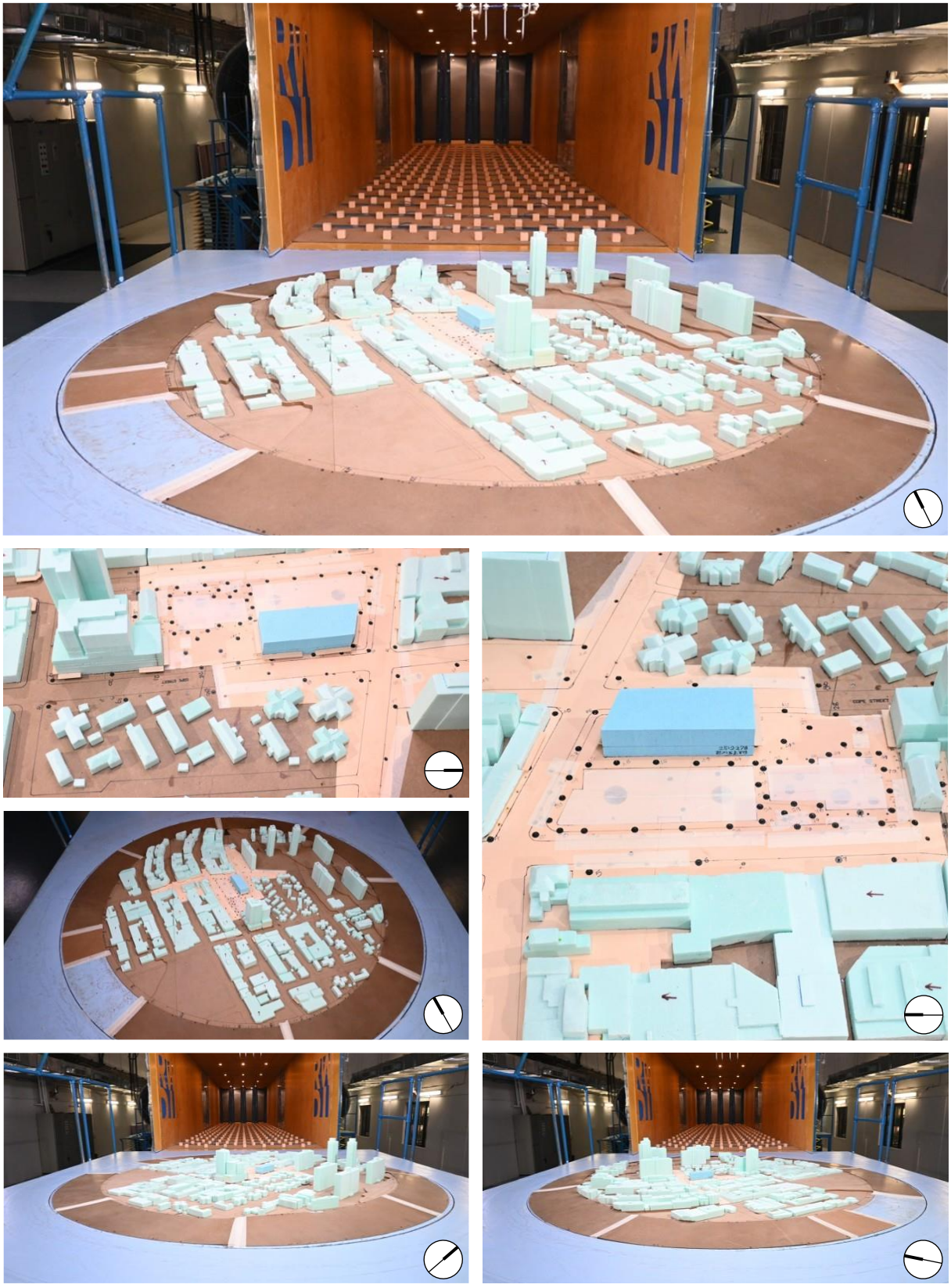

Image 2A: Wind Tunnel Study Model – Existing Configuration

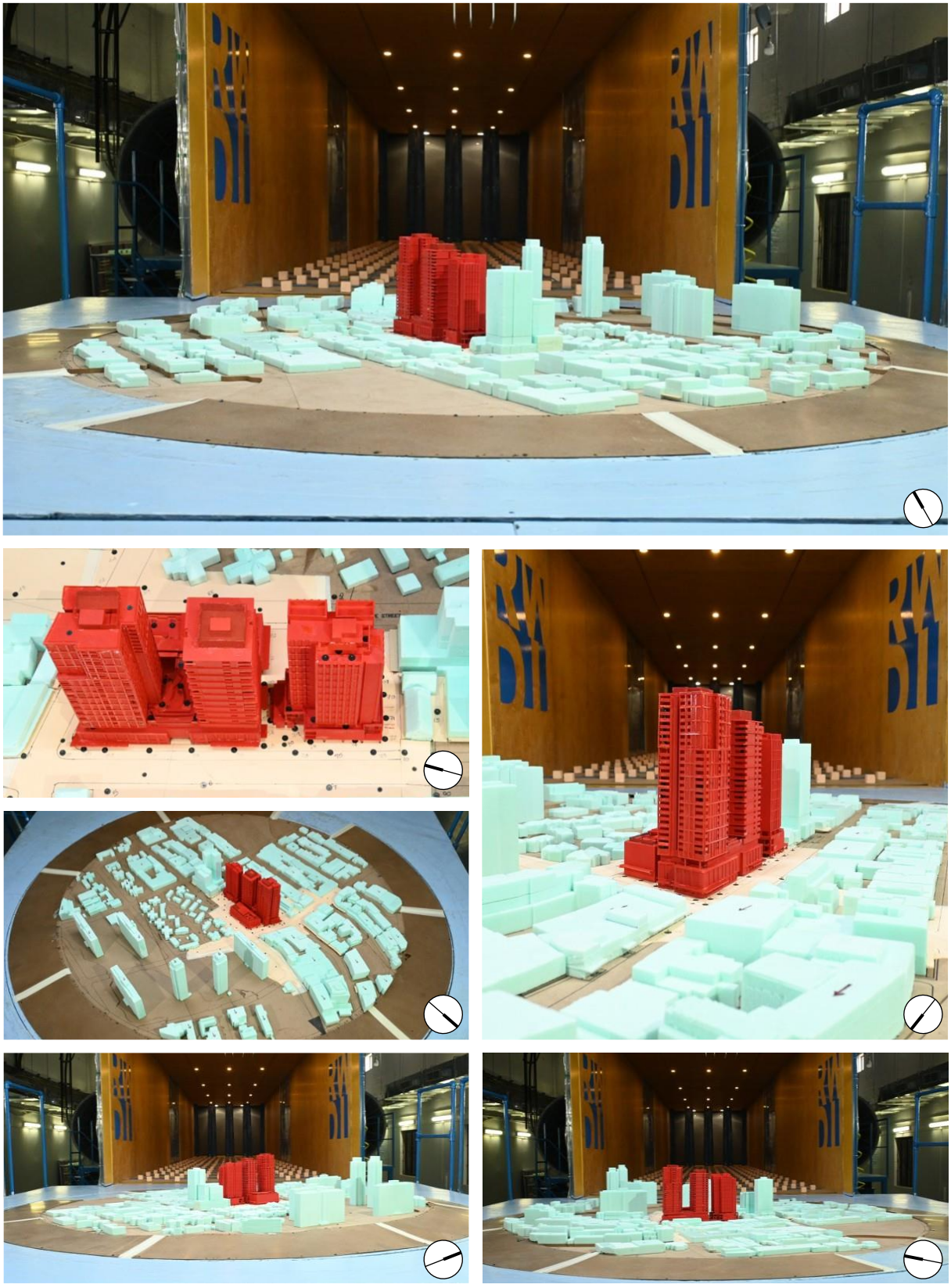

Image 2B: Wind Tunnel Study Model – Proposed Configuration

2.2 Meteorological Data

Wind statistics recorded at Sydney International Airport between 1995 and 2022, inclusive, were analysed for the study. The observation site is located approximately 7.5 km to the southwest of the project site. Image 3 graphically depicts the annual directional distributions of wind frequencies and speeds recorded at the station. Winds from the northwest, west, northeast, and south directions are predominant throughout the year. Strong winds of a mean speed greater than 8 m/s measured at the airport (at an anemometer height of 10 m) occur for approximately 12.8% of the time throughout the year.

Time-history of the wind for the period above were combined with the wind tunnel data to predict the frequency of occurrence of full-scale wind speeds at the site. The full-scale wind predictions were then compared with the wind criteria for pedestrian comfort and safety.

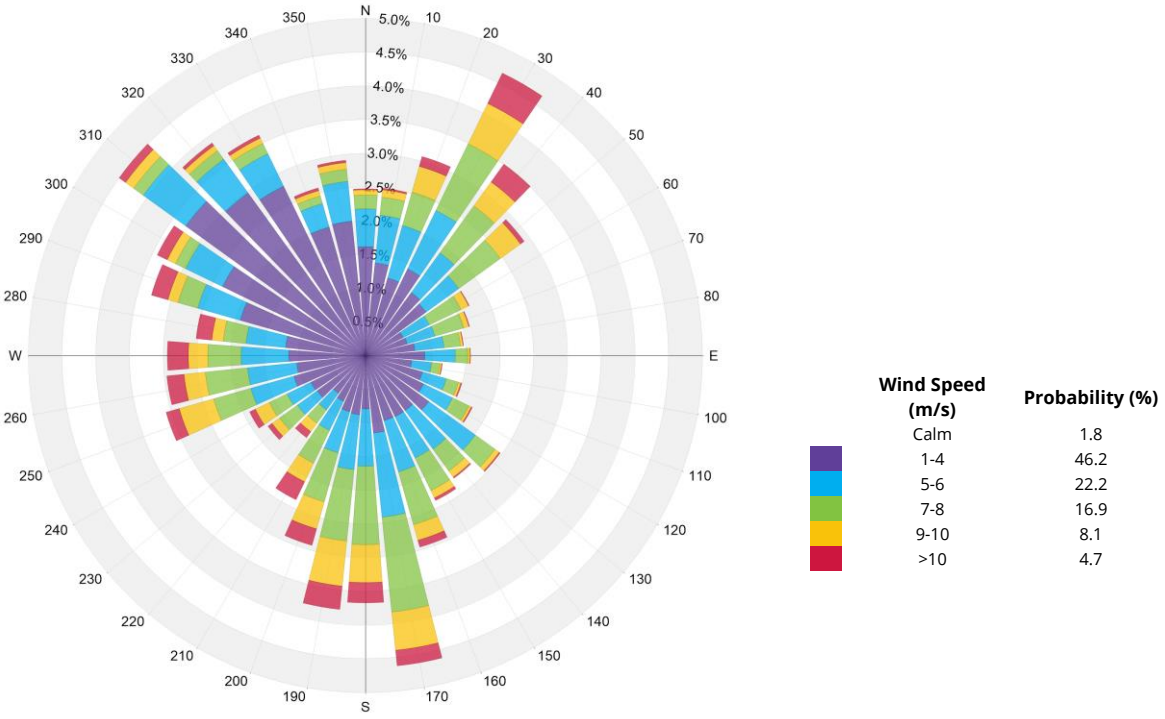

Image 3: Directional Distribution of Winds Approaching Sydney International Airport (1995 to 2022)

2.3 Pedestrian Wind Criteria

The wind design criteria presented in the "*Waterloo Metro Design Quality Guidelines section 3G Wind*", as described in Image 4 and Table 6 below, have been considered to assess the pedestrian wind conditions around the development site for the various configurations. The design criteria specify the following:

> *Mitigate wind impacts on the public domain and achieve the following targets:*
>
> - *At least 50% of the publicly accessible open space meets the wind comfort standard for sitting. Outdoor dining and casual seating areas should correspond with these areas.*
> - *Waiting areas at bus stops and pedestrian crossings is to meet the wind comfort standard for standing.*
> - *Development must not exceed the wind safety standard of 24m/s (gust - 0.1% exceedance).*

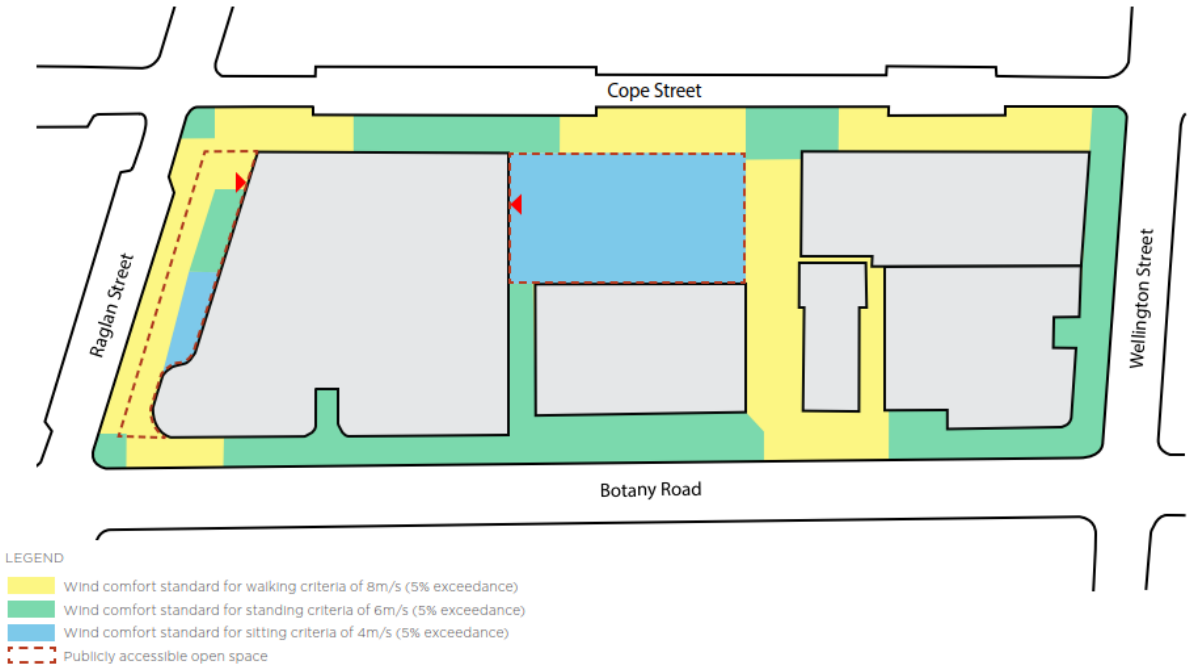

Image 4: Waterloo Metro Design Quality Guidelines
(Figure 20 – Wind Comfort and Safety Targets)

Table 6: Pedestrian Wind Comfort and Safety Criteria

Comfort Category	GEM Speed (m/s)	Description
Sitting	≤ 4	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away
Standing	≤ 6	Gentle breezes suitable for main building entrances, bus stops, and other places where pedestrians may linger
Walking	≤ 8	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 8	Strong winds of this magnitude are considered a nuisance for all pedestrian activities, and wind mitigation is typically recommended

Notes:
(1) GEM speed = max (mean speed, gust speed/1.85); and,
(2) GEM speeds listed above are based on a seasonal exceedance of 5% of the time between 6:00 and 22:00.

Safety Criterion	Gust Speed (m/s)	Description
Exceeded	> 24	Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

Notes:
(1) Based on an annual exceedance of 9 hours or 0.1% of the time for 24 hours a day; and,
(2) Only gust speeds need to be considered in the wind safety criterion. These are usually rare events but deserve special attention in city planning and building design due to their potential safety impact on pedestrians.

Note 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 an individual's perception of the wind climate. For an assessment of total human comfort, typically a thermal comfort assessment is recommended.

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1.1A through 2.2D located in the "Figures" section of this report. These conditions and the associated wind speeds are also represented in Table 1, located in the "Tables" section of this report. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use of each area of interest. Note that the initial wind tunnel tests have been carried out without any form of vegetation to establish a baseline understanding of the wind conditions around the site.

3.1 Generalised 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 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, deep canopies close to ground level, windscreens / tall trees with dense landscaping, etc. as shown in Image 5 can help to reduce the 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.

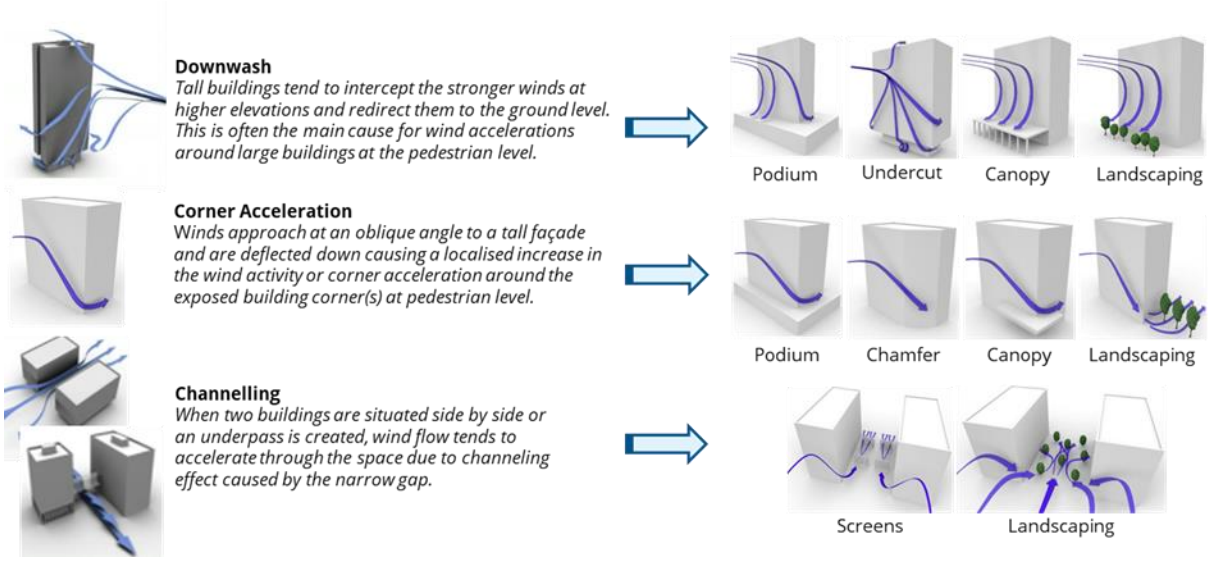

Image 5: General Wind Flows around Buildings and Examples of Wind Control Measures

3.2 Pedestrian Wind Safety

3.2.1 Existing Configuration

Wind safety conditions within and around the existing site are shown in Figure 2.1A. Wind speeds exceeding the safety limits were noted at two locations to the north-east of the site along Cope Street (Sensors 42 and 43). These exceedances are caused by the interaction of the westerly prevailing winds with the existing high-rise Marton Building and impacting the Cope Street frontage.

3.2.2 Proposed Configuration

Wind safety conditions within and around the Proposed Development site are shown in Figures 2.1B and 2.2B. The following key observations can be made with regards to wind safety conditions around the site:

- With the inclusion of the Proposed Development, the existing safety exceedances to the north-east of the site along Cope Street were observed to persist.
- An additional marginal exceedance was observed at the eastern end of the Church Square (Sensor 69) caused by westerly and southerly winds channelling through the corridor area.

Wind conditions for all other ground level areas within and around the Waterloo Metro Precinct were noted to satisfy the safety limit criteria of 24 m/s. Similarly, all elevated locations of Building 1 (Northern Precinct) and Building 2 (Central Precinct) were noted to satisfy the criteria.

3.3 Pedestrian Wind Comfort

3.3.1 Existing Configuration

Wind comfort conditions within the existing site are shown in Figure 1.1A. The majority of the ground level areas throughout the existing site were observed to be suitable for standing to walking use throughout the year, with 4 locations suitable for sitting to the east and north of the site (Sensors 1, 31, 32 and 41). Two locations were observed to have uncomfortable wind conditions located to the north of the site along Cope Street opposite the Marton Building and at the north-western corner of the Waterloo Congregational Church.

Wind conditions within the surrounding streets of the site gener`ally range from sitting to standing use along the northern half of the site. Along the southern portions of Cope Street and Botany Road, wind conditions were observed to generally satisfy walking criteria. These areas are subject to higher wind impacts from the existing high-rise Buildings 3 and 4 of the Southern Precinct of the Waterloo Metro Quarter. Similarly, the existing high-rise Marton Building at the north of Cope Street also causes uncomfortable conditions (Sensor 43) and walking use conditions along Raglan Street to the east (Sensors 39, 42 and 44).

3.3.2 Proposed Configuration

3.3.2.1 Ground Level Areas

Ground level wind comfort conditions within and around Buildings 1 and 2 are shown in Figure 1.1B. It is noted that overall wind comfort levels align well with the requirements of Waterloo Metro Design Quality Guidelines. Key wind effects are noted below:

- Wind conditions around key entrances are expected to be comfortable for standing use, as required.

- Wind conditions within Cope Street Plaza and along Raglan Walk as well as at the Botany Road bus stop (Sensor 78) are expected to satisfy the standing comfort criteria without the inclusion of landscaping.
- Wind conditions at the majority of ground level areas within and around the Proposed Development were observed to range from standing to walking use throughout the year. Higher winds, suitable for walking use, persist around Buildings 3 and 4 from the existing scenario and are likely to occur along Raglan Street frontage and through the various east-west aligned channels between the buildings for the proposed scenario (e.g. Grit Lane and Church Square).
- Three locations situated within recessed areas on the eastern and western perimeters of Building 2 are expected to be suitable for sitting use without the inclusion of any landscape (Sensors 66, 76 and 79).
- Four locations were observed to have uncomfortable wind conditions. These are located at the north-western corner of Building 1 along Botany Road (Sensor 60), at the south-eastern corner of Building 1 along Raglan Walk and Grit Lane (Sensors 50 and 51), and at the south-eastern corner of Building 2.
- Proposed seating areas are located within Grit Lane (Sensors 51, 52, 53) and along the eastern perimeter of Building 2 (Sensors 65, 66, 67, 68). Wind conditions within Grit Lane were observed to exceed the targeted sitting use for the area. Similarly, while one location (Sensor 66) satisfies the sitting criteria without the inclusion of landscaping other locations along the eastern perimeter of Building 2 satisfy standing criteria. Mitigation Studies in Section 3.4 shows the effect of proposed landscaping within these proposed seating areas and Section 3.5 provides additional recommendations to improve wind conditions to sitting criteria levels.

3.3.2.2 Elevated Areas

Wind conditions for private or communal outdoor areas associated with a development should aim to achieve the standing criteria for patron comfort. This criterion is in line with the expected use of the space where people would remain stationary for short periods of time with the knowledge that they are in an elevated outdoor environment. Elevated outdoor areas intended for circulation use such as bridges or narrow walkways however should target walking criteria for their expected use. On the other hand, for private balconies, the target wind comfort level is typically standing 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 they do not exceed the comfort criteria. Wind conditions within elevated areas are discussed below and shown in in Figure 1.2B:

Building 1 (Northern Precinct) Elevated Areas

- The **Level 3** Northern Terrace is exposed to the north-easterly and westerly winds that downwash off Building 1A façade and channel through the area. These winds create walking use conditions within the terrace (Sensor 82). However, the proposed shrub planting around the terrace is expected to reduce the strength of these winds and bring the area to standing use conditions.
- The **Level 4** Outdoor terrace spaces atop the Metro building and between Buildings 1A and 1B on the podium rooftop are exposed to the north-easterly and westerly winds which directly impact these areas. Channelling of these winds were also observed through the area between towers 1A and 1B. However, the raised planters and porous balustrading throughout the space assist in reducing the strength of these winds. Wind conditions within the outdoor area atop the Metro building ranges from sitting to standing and increases to walking conditions approaching and along the bridge link to Building 1. These walking conditions continue to the garden walkways within the area between Buildings 1A and 1B with the private balconies in this area satisfying sitting and standing criteria.

- The wind conditions on the majority of **balconies** were observed to be suitable for passive use throughout the year, ranging from sitting to standing use. The south-western corner balconies above approximately Level 20 of Building 1B however can experience windier conditions which can lead to walking conditions based on the 95% exceedance criterion, however it is noted that these balconies are comfortable for standing 93% of the time. No private balconies within Building 1 are expected to exceed the comfort criteria.

Building 2 (Central Precinct) Elevated Areas

- Outdoor childcare spaces are proposed on **Levels 1 and 2** along the northern (Sensors 118 and 119) and southern (Sensors 120 and 121) aspects of Building 2. The northern outdoor spaces were observed to satisfy standing criteria at the western end (Sensor 118) with sitting criteria achieved at the more recessed eastern areas (Sensor 119). At the southern outdoor spaces standing criteria is also achieved at the western areas (Sensor 121). However, the south-eastern corner areas (represented by Sensor 120) can reach walking conditions due to the exposure to north-easterly and southerly winds. This is typically suitable for active play areas.
- Wind conditions at the **Level 3** terrace reach walking conditions at the north-west corner (Sensor 122) and south-east corner (Sensors 124 and 125) due to their exposure to the acceleration of local winds around the corners. Other locations within the Level 3 terrace are located in less exposed regions and satisfy sitting and standing criteria.
- The rooftop terrace on **Level 24** is only exposed to the westerly winds due to the shielding from the building from the north-easterly winds and the tall impermeable southern wall shielding against the southerly winds. The combination of these elements reduces overall impact of regional winds leading to wind conditions suitable for standing use within the terrace and walking conditions within the narrow walkway along the southern wall.

3.4 Wind Mitigation Studies

Based on the findings of these initial wind tunnel tests, additional studies have been undertaken with the inclusion of the following wind mitigation measures:

- **Mitigation – Safety Configuration (See Image 6A and Image 6B):** Wind mitigation studies were undertaken to resolve the wind safety exceedance observed for the proposed site configuration. No landscaping was included for this round of mitigation. The following elements were included in the tests to reduce wind impacts:
    - Porous balustrades along Church Square corridor.
    - 2 m high impermeable wall at the Church Square corridor, representative of a 1 m high impermeable balustrade atop a vertical step terrain change.
- **Mitigation – Comfort Configuration (See Image 7):** This round of mitigation testing was undertaken to ascertain overall site conditions with the inclusion of existing and proposed site landscaping. This case represents the actual site conditions that will likely be experienced for day-to-day use. The following items were included in this round of testing:
    - Porous balustrades along Church Square corridor.
    - 2m high impermeable wall at the Church Square corridor, representative of a 1 m high impermeable balustrade atop a vertical step terrain change.

- Landscaping including densely foliating tree and shrub planting throughout site along ground and elevated terraces as well as existing street trees.

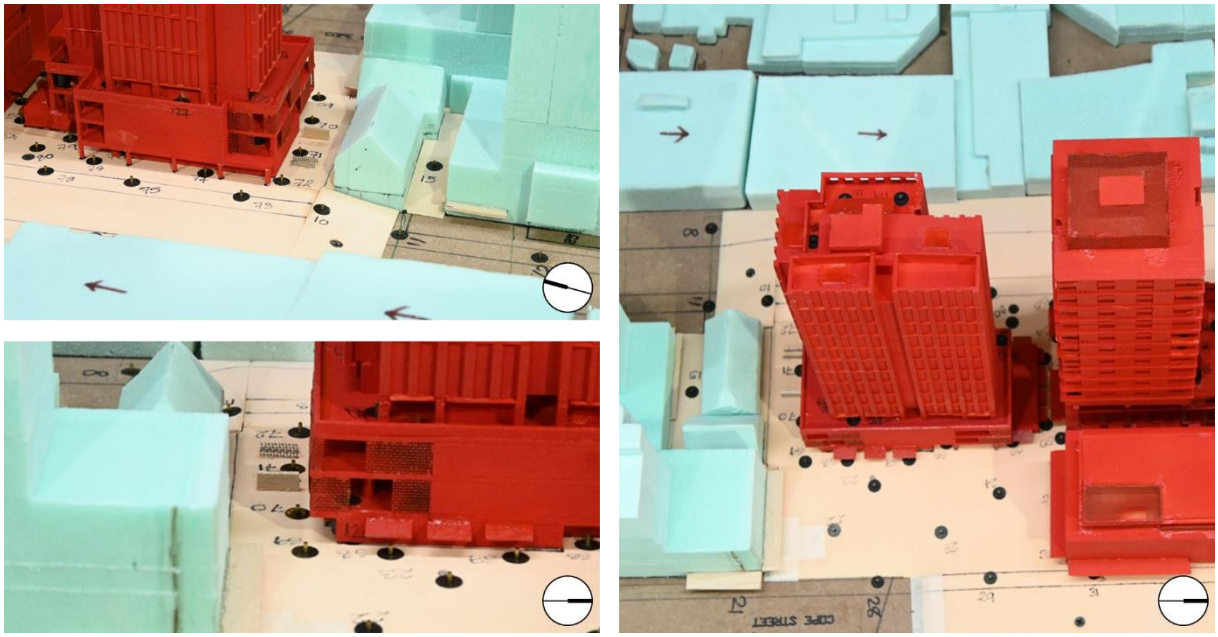

Image 6A: Wind Tunnel Study Model – Mitigation – Safety Configuration Screening elements

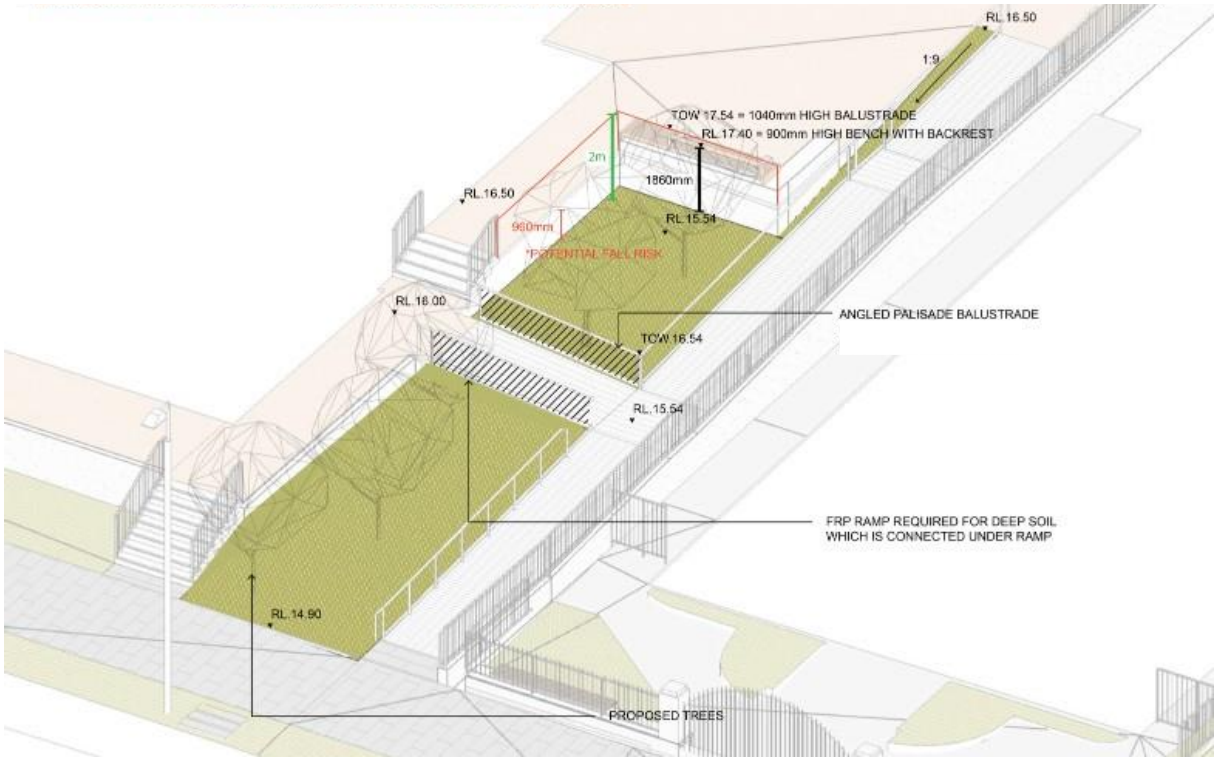

Image 6B: Render of Screening Elements: Porous balustrades and 2m vertical wall

Image 7: Wind Tunnel Study Model – Mitigation – Comfort Configuration
Screening Elements and Landscaping

3.4.1 Mitigation – Safety Configuration

Wind conditions within and around the Proposed Development for the Mitigation – Safety Configuration are shown in Figures 1.1C and 1.2C for comfort and Figures 2.1C and 2.2C for safety.

With the inclusion of the porous balustrades and the 2m high impermeable wall the safety exceedance at the eastern end of Church Square is mitigated. The screening elements introduced in this configuration were observed to generally have localised effects and minimal changes were observed outside of Church Square. Within the corridor, standing criteria is achieved along the southern frontage of Building 2 with walking conditions at the south-eastern corner of Building 2, mitigating the uncomfortable conditions in the Proposed configuration. Based on the effectiveness of these tested mitigations within the Church Square, it is expected that height of the vertical wall element can be reduced to a 1.5 m tall vertical step comprised of a 0.6 m vertical terrain step with an impermeable 0.9 m high back rest along a bench. This is shown in Image 8A and marked up in Image 8B and has been incorporated into the landscape architectural design.

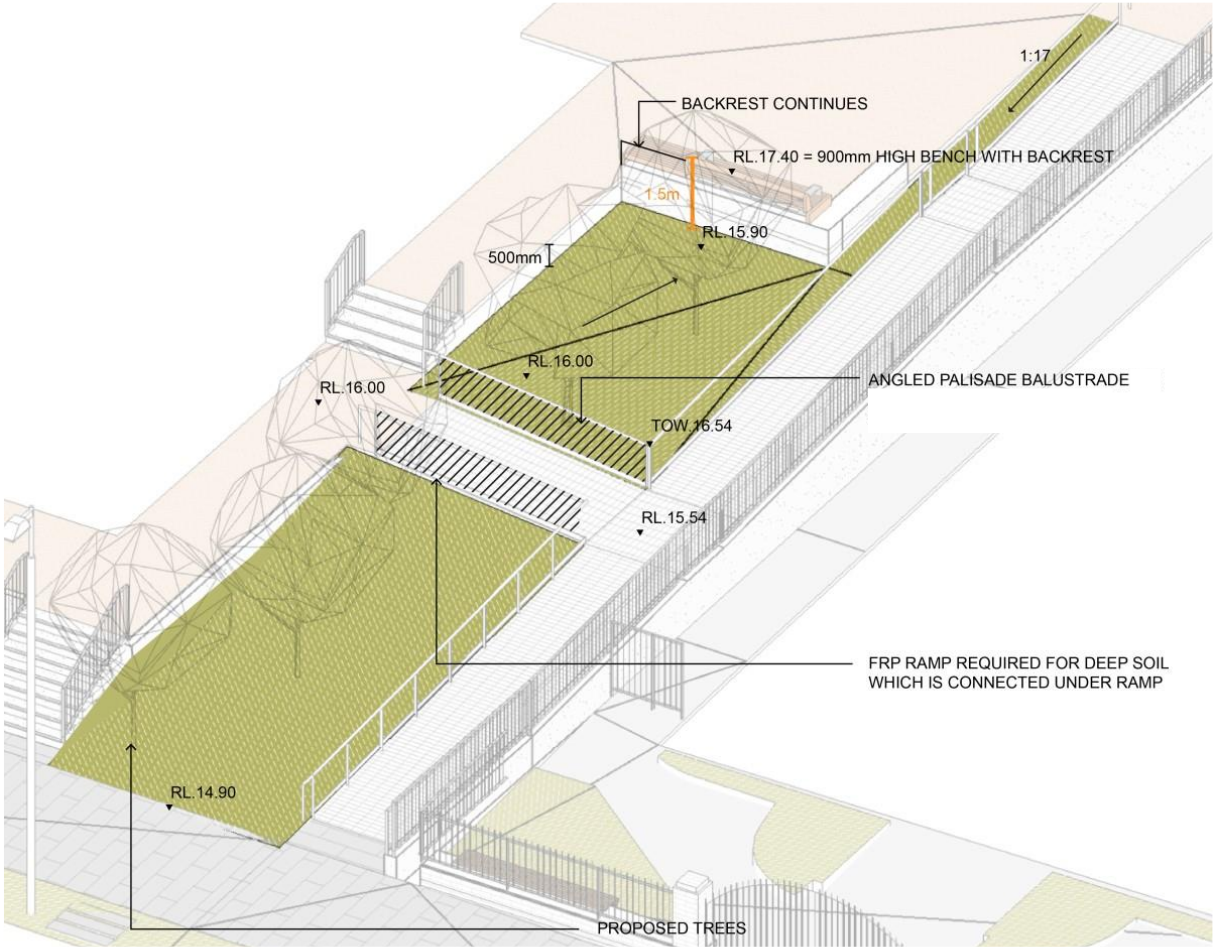

Image 8A: Render of Screening Elements: Porous Balustrades and 1.5m Vertical Wall

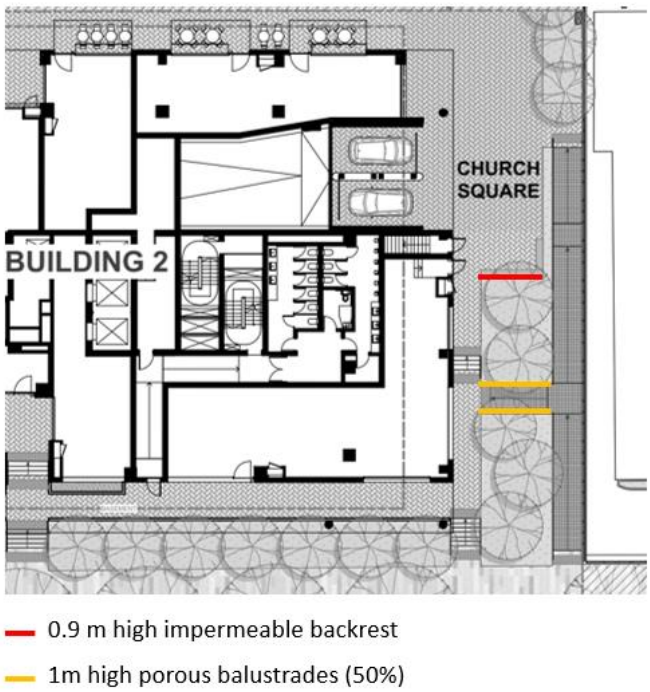

Image 8B: Markup of screening elements within Church Square incorporated in the landscape architectural design

3.4.2 Mitigation – Comfort Configuration

Wind conditions within and around the Proposed Development for the Mitigation – Comfort Configuration are shown in Figures 1.1D and 1.2D for wind comfort and Figures 2.1D and 2.2D for wind safety. It is important to note that figures relating to the safety criterion are provided for information only: the Proposed Development does not rely on landscaping to mitigate any safety exceedances.

The inclusion of landscaping in the form of tree and shrub planting throughout the site and along elevated areas improves wind conditions significantly. All uncomfortable conditions are mitigated with 11 locations satisfying the walking criteria and the majority of the ground level areas observed to satisfy the sitting or standing criteria throughout the year. Key wind effects are discussed below.

3.4.2.1 Ground Level Areas

Wind conditions along Raglan, Cope and Botany Streets were markedly improved with the introduction of proposed landscaping within the site and existing trees outside of site bringing the majority of the footpath areas to within sitting and standing conditions. Wind at the Botany Road bus stop also improves to satisfy the sitting comfort criteria. The uncomfortable conditions at the north-western corner of Building 1 and along Grit Lane are also mitigated down to walking conditions. Wind conditions around the four corner pedestrian crossings are also improved with all but the Cope Street and Wellington Street corner satisfying the required standing criteria. It is noted that potential landscaped areas exist around the Cope Street and Wellington Corner which includes tree planting as part of the proposed landscaping of the Southern Precinct that were not included as part of the mitigation testing for the Northern and Central Precincts. With the inclusion of these trees, it is expected that standing conditions will be achieved at this corner.

Wind conditions within Cope Street Plaza, represented by sensors 23, 24, 27 and 28, improve for a majority of locations satisfying the standing criteria with calmer zones adjacent to Building 2 suitable for sitting use. A number of locations within Cope Street Plaza which satisfy standing were also noted to be suitable for sitting conditions for 90% to 93% of the time compared to the 95% exceedance criterion, marginally below the sitting criteria. The Church Square corridor similarly improves upon the mitigation testing with the screening elements as the landscaping further buffers then channelled flows bringing sitting conditions to the western half of the corridor and standing at the eastern half. Wind conditions within proposed seating areas along the eastern perimeter of Building 2 were also found to improve with the inclusion of landscaping. Two locations (Sensors 66 and 67) now satisfy the sitting criteria and seating areas near the corner of the building were noted to be suitable for sitting conditions for 89% to 93% of the time compared to the 95% exceedance criterion.

Raglan Walk which is located away from the added vegetation shows no difference in overall wind conditions which are still suitable for passive standing use. The adjacent Grit Lane, however, benefits from the planting outside its western entrance which slows the westerly winds down and reduces the strength of the channelling. This mitigates the uncomfortable conditions at the eastern end of the laneway with conditions expected to be suitable for walking use at the corner and along the laneway. Walking conditions within the laneway however exceed the targeted seating use, additional recommendations are provided in Section 3.5 to improve wind conditions to sitting criteria levels.

3.4.2.2 Elevated Areas

Building 1 (Northern Precinct) Elevated Areas

- Perimeter shrub planting is proposed around the **Level 3** terrace area, however, this was not modelled in the mitigation studies. Its inclusion is expected to reduce the wind exposure of the terrace and is expected to improve conditions within the terrace to standing conditions.
- **Level 4** rooftop amenity areas above the Metro Building were found to all meet sitting criteria with the introduction of the proposed tree and shrub landscaping.
- **Level 4** rooftop amenity areas between towers 1A and 1B were also improved with the introduction of the proposed tree and shrub landscaping throughout the spaces. The garden walkways were found to satisfy standing conditions and the private terraces within the area were observed to satisfy the sitting criteria.

Building 2 (Central Precinct) Elevated Areas

- Perimeter shrub planting is proposed around the outdoor childcare spaces on **Levels 1 and 2** along the northern and southern aspects of Building 2. This vegetation was not modelled in the mitigation studies, however, with inclusion of this vegetation, the wind conditions are expected to improve such that the south-eastern area would potentially reduce from walking conditions to standing conditions. Note that, as mentioned earlier, walking wind conditions are typically suitable for active play areas.
- The **Level 3** terrace space also showed improvement with the introduction of the proposed perimeter shrub and tree planting leading to majority of areas to achieve sitting and standing criteria. However, the south-eastern corner of the terrace is expected to be suitable for walking use. While the proposed seating area at the north-east corner of the terrace (Sensor 123) satisfies the sitting criteria, the proposed sitting areas at the west (Sensor 128) and south-eastern corner (Sensors 124 and 125) only satisfy standing or walking criteria.

3.5 Wind Mitigation Strategy

3.5.1 Ground Level

The wind tunnel study conducted for the Waterloo Metro Quarter precinct has assessed the expected wind comfort conditions in relation to the precinct's design objectives, as outlined in Image 4. The results indicate that, under typical conditions, the majority of ground-level areas within and around the precinct meet the required wind comfort and safety criteria with the inclusion of screening within Church Square and the existing and proposed landscaping. While the study identified a few localised areas that exceed the relevant precinct requirements (e.g., the sitting zone in Cope Street Plaza, standing zones in Grit Lane, and at the Cope Street/Wellington Street intersection), these instances are limited and are not expected to significantly detract from the overall pedestrian experience.

As discussed previously in Section 3.4.2.1 it is noted that landscaped areas around the Cope Street and Wellington Corner includes tree planting as part of the proposed landscaping of the Southern Precinct that were not included as part of the mitigation testing. With the inclusion of this landscaping, as already incorporated in plans for the Southern Precinct, it is expected that standing conditions will be achieved at this corner, meeting the sitting criteria as per the Waterloo Metro Design Quality Guidelines.

The proposed raised planter areas and shrub planting within Cope Street Plaza, not modelled in the mitigation testing, are expected to improve the wind conditions within the plaza. As previously mentioned in Section 3.4.2.1 a number of locations within the Cope Street Plaza were marginally below the sitting criteria. With the inclusion of the raised planter areas and shrub planting, more than 50% of the Cope Street Plaza area is expected to satisfy the sitting criteria meeting the criteria as per the Waterloo Metro Design Quality Guidelines.

Wind conditions within proposed seating areas along the eastern perimeter of Building 2 are also expected to generally improve with inclusion of proposed raised planter areas and shrub planting within Cope Street Plaza and consideration of the additional mitigation measures for Grit Lane (see below). With the inclusion of these measures the proposed seating areas near the corner of the building which are suitable for sitting conditions for 89% to 93% of the time are expected to improve to satisfy the sitting criteria. It is noted if seating areas are located further in from the corners of Building 2 sitting conditions are expected to be met without any additional measures.

To improve comfort levels within Grit Lane for the proposed seating areas, additional wind mitigation measures as discussed below can be considered. Given the generally calm wind conditions however, such measures should be carefully balanced to avoid overly obstructing winds which can impact natural ventilation in outdoor spaces, which plays a key role in maintaining thermal comfort and air quality throughout the precinct.

> **Grit Lane:** Porous balustrade elements (50% porosity) can be incorporated along the raised seating area along the western perimeter of Building 2 to assist in diffusing the winds within the corridor. It is recommended to incorporate localised perpendicular wind screens running north-south within the raised seating areas along Grit Lane. These wind screens are expected to help diffuse any channelled winds in the area and are expected to positively contribute to pedestrian comfort. See Image 9 for a markup of these recommendations.
> Tree planting atop the northern Level 2 green roof of Building 2 or an awning connecting Buildings 1 and 2 can also be included to further mitigate wind channelling effects within Grit Lane, if further reduction in wind speeds is required.

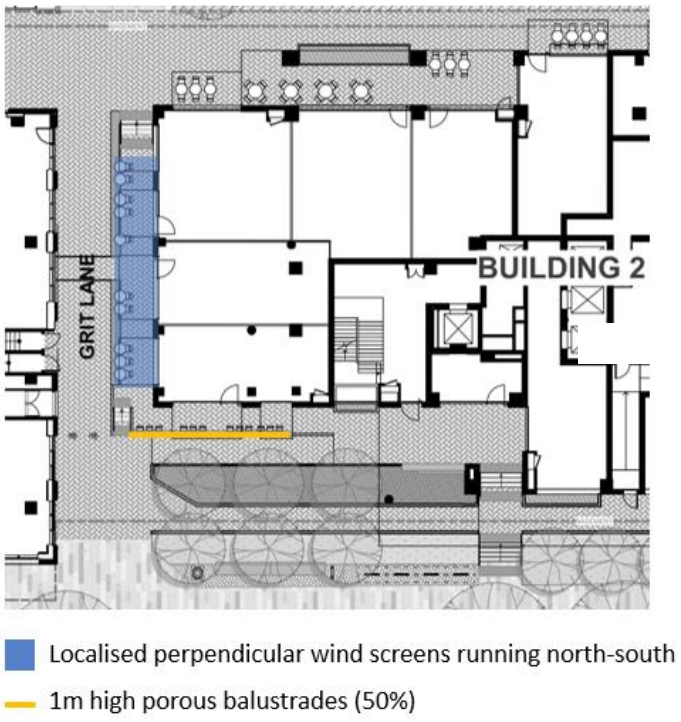

Image 9: Additional Mitigation Measures for Grit Lane

3.5.2 Elevated Levels

Testing for conditions associated with the elevated trafficable spaces found no uncomfortable conditions at these spaces. However, there were localised exceedances of the recommended criteria which can benefit from additional measures:

- **Building 2 Level 3 Terrace:** Impermeable balustrading around the proposed sitting areas at the west and south-eastern corner is recommended to reduce the exposure of the north-easterly and southerly winds impacting these areas. Alternatively, the density and height of the planting around these spaces can be increased to increase the protection provided.

3.6 Cumulative Impact Assessment (CIA)

As outlined in the Department of Planning, Housing and Infrastructure's "Cumulative Impact Assessment Guidelines for State Significant Projects" project level cumulative impact assessment (CIA) is considered for the impacts of the proposed Waterloo Metro Quarter development ("Proposed Development") in combination with other reasonably foreseeable and wind significant future projects within the vicinity (See Image 10). This CIA is also proportionate to the scale and significance of the Proposed Development and the considered future projects.

The key matters pertaining to wind impacts on the public domain are discussed in the following sections for the various future projects considered, focusing on the difference between the expected future wind conditions with or without the Proposed Development under consideration.

Image 10 – Nearby Future Developments

3.6.1 Waterloo Estate

The Waterloo Estate lies to the east of the Proposed Development and comprises Waterloo North, Central and South developments. Images 11 and 12 below outline the boundaries of these developments including the Proposed Development site boundary.

The six existing buildings within Waterloo North and Central areas are not subject to redevelopment (See Images below). The cumulative impacts of the Waterloo Estate are therefore expected to be focused around the redevelopment of the Waterloo South areas. Images below shows the proposed building heights of the Waterloo South redevelopment area which also includes a proposed park (Main Park) at the northern end of the area directly east of the Proposed Development. The proposed building heights are predominantly mid-rise, ranging from 6-13 storeys throughout the redeveloped area with low rise buildings spread throughout. Three high-rise buildings are proposed along the southern perimeter of the redevelopment area along McEvoy Street and range from 27-33 storeys.

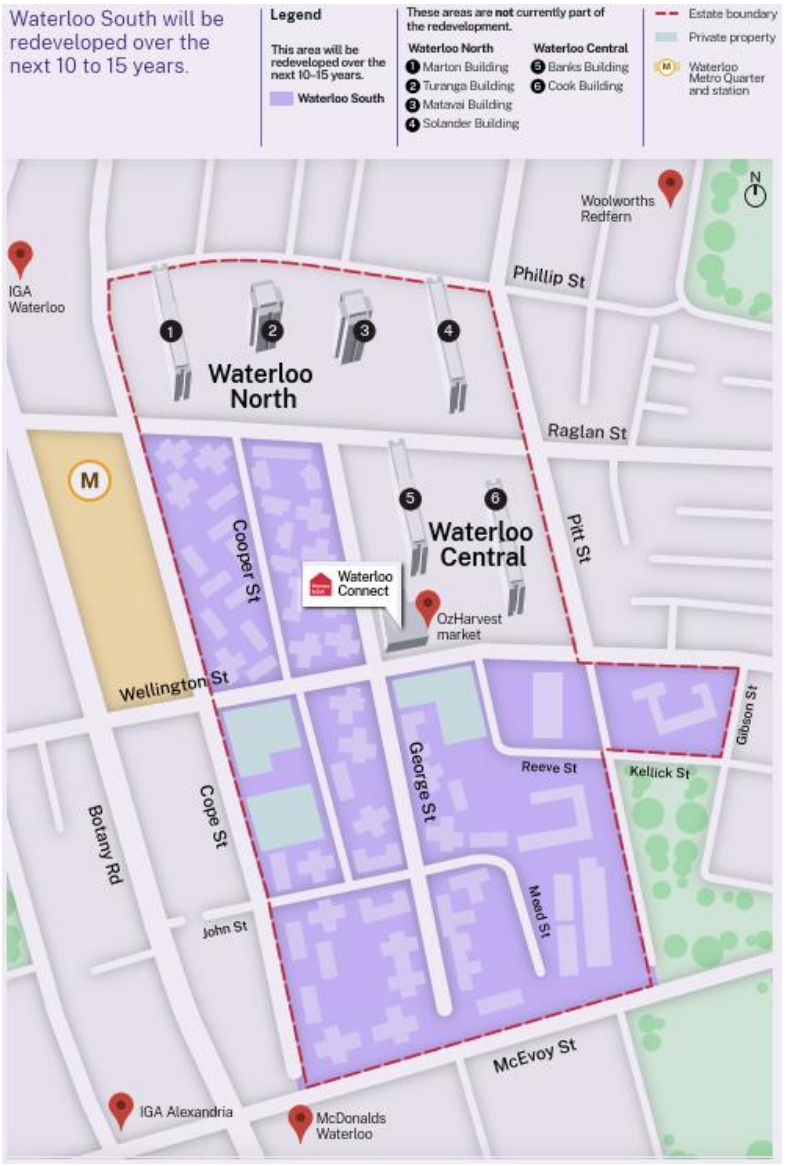

Image 11 – Waterloo Renewal Project Development Areas

(Extract from Waterloo South Relocation and Support Guide February 2025)

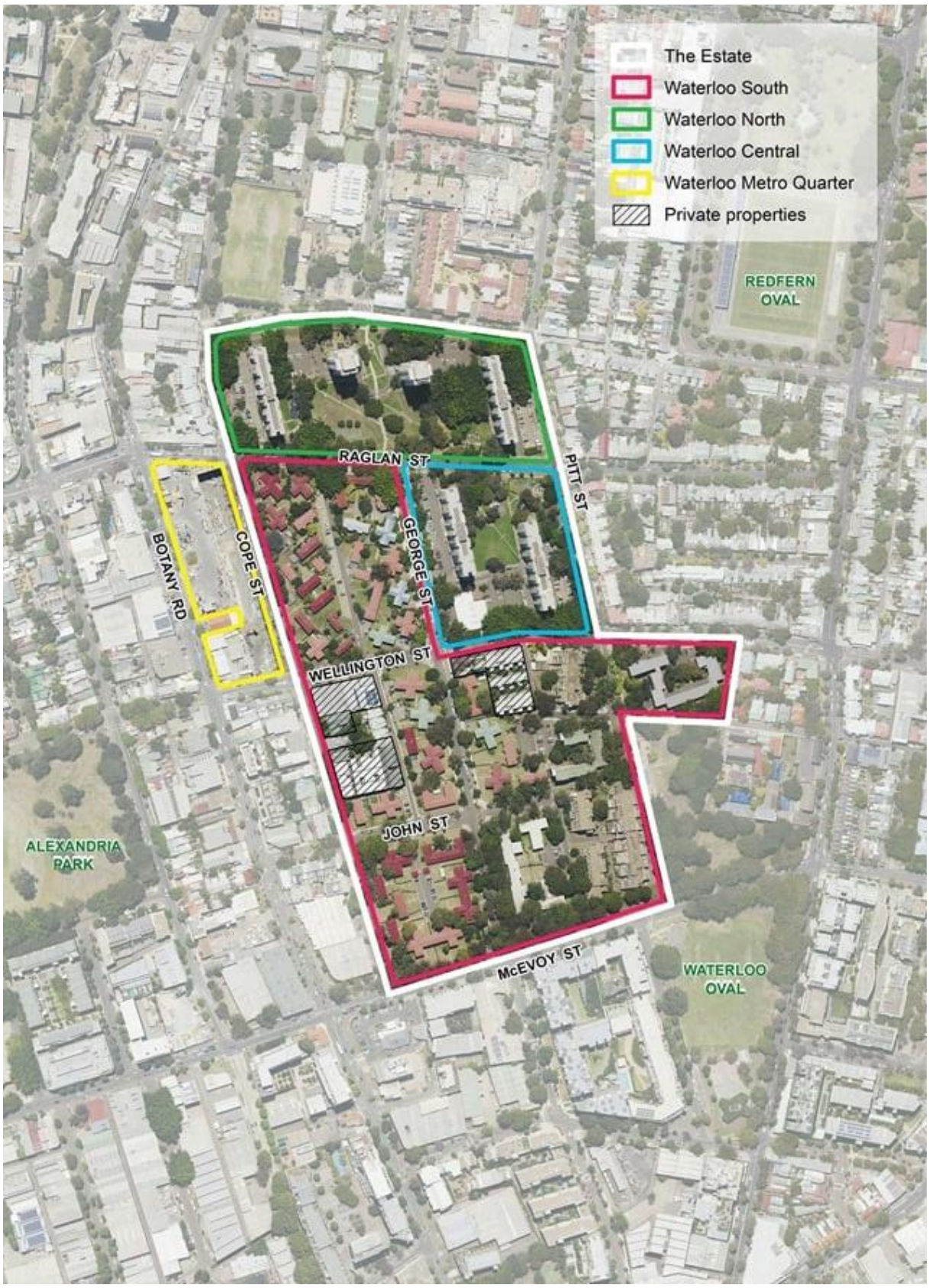

Image 12 – Waterloo Renewal Project Development Areas

(Extract from City of Sydney Planning Proposal Webpage)

Image 13 – Waterloo South Building Heights Map

(Extract from Planning NSW Waterloo South Webpage)

Image 14 – Render of Waterloo South Buildings

(Extract from Planning NSW Waterloo South Webpage)

3.6.1.1 Impacts on Proposed Development Areas

The prevailing winds from the northwest, west and northeast directions are not expected to significantly impact the pedestrian areas of the Proposed Development which lie upwind to the north-west of the Waterloo South buildings for these directions. The Waterloo South buildings have the potential to increase funnelling along the north-south aligned streets which can increase wind speeds along Cope Street, potentially impacting the eastern trafficable areas of the Proposed Development. However, the proposed Main Park to the east of the Proposed Development is expected to allow the prevailing southerly winds to expand into the space and reduce speeds. Landscaping within the Main Park and along Cope Street also has the potential to reduce any high winds flowing from the Waterloo South redevelopment areas. Hence, the overall wind environment in the vicinity of the Proposed Development is not expected to be significantly impacted with the inclusion of the Waterloo South buildings.

3.6.1.2 Impacts on Waterloo South Redevelopment Areas

The public spaces within the Waterloo South redevelopment areas are mostly enclosed within the proposed buildings and shielded from the prevailing winds. These spaces also lie to the south-east of the Proposed Development and are not expected to be impacted by the prevailing winds from the northeast, south and west directions with the inclusion of the Proposed Development. The Proposed Development is expected to provide some shielding from the prevailing north-westerly winds to these open spaces.

The proposed Main Park of the Waterloo South development has the potential to be impacted by the Proposed Development. The prevailing southerly and north-westerly winds may be directed into the park area and along Cope Street; however, wind conditions are not expected to be significantly different to those found in the

previous wind tunnel testing. The Proposed Development is expected to provide a significant buffer to the westerly winds for the park area. Furthermore, any proposed landscaping within the proposed Main Park space is also expected to reduce the strength of any winds that flow into the park space.

3.6.2 Other Significant Developments

Other future developments that are reasonably expected to be built within the vicinity of the Proposed Development which may also impact wind conditions include the Redfern North Eveleigh development (See Image 15) and Redfern Place (See Image 16). These developments lie to the north-west and north-east of the Proposed Development and comprise of high-rise residential buildings. Due to their distance from the project site, these developments are expected to only provide minor shielding to the project site from the north-westerly and north-easterly prevailing winds. Similarly, these future residential developments are also expected to have minimal impact on the public domain within and around the Proposed Development.

Image 15 – Render of Redfern North Eveleigh Buildings

(Extract from Transport of NSW – Paint Shop Sub Precinct: Rezoning Proposal Approval – March 2023)

Image 16 – Render of Redfern Place Buildings

(Extract from Ethos Urban – Environmental Impact Statement – Redfern Place – March 2023)

4 STATEMENT OF LIMITATIONS

Limitations

This report entitled '*Waterloo Metro Quarter- SSDA Pedestrian Wind Environmental Report*' was prepared by RWDI Australia Pty Ltd ("RWDI") for WL Developer ("Client"). 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.

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.

Design Assumptions

RWDI confirms that the pedestrian wind assessment (the "**Assessment**") discussed herein was performed by RWDI in accordance with generally accepted professional standards at the time when the Assessment was performed and in the location of the Project. No other representations, warranties, or guarantees are made with respect to the accuracy or completeness of the information, findings, recommendations, or conclusions contained in this Report. This report is not a legal opinion regarding compliance with applicable laws.

The findings and recommendations set out in this report are based on the following information disclosed to RWDI. Drawings and information listed below were received and used to construct the scale model of the proposed development **("Project Data**").

File Name	File Type	Date Received
WMQ-BD1-WBG-AR-DRG-DA110M[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA110[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA111[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA112[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA113[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA114[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA115[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA120[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA125[A].dwg	AutoCAD drawing	11 August 2025

File Name	File Type	Date Received
WMQ-BD1-WBG-AR-DRG-DA127[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA128[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BD1-WBG-AR-DRG-DA129[A].dwg	AutoCAD drawing	11 August 2025
WMQ-BMT-WBG-AR-DRG-DA091[A].dwg	AutoCAD drawing	11 August 2025
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WMQ-BD2-BSA-AR-DRG-DA03.101_cad[A].dwg	AutoCAD drawing	11 July 2025
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WMQ-BLD2-BSA-AR-MDL-0101-RVT-R24[A].rvt	Revit	11 July 2025

RWDI have reviewed the subsequent SSDA drawings and confirm that these are aligned with the earlier drawings used to fabricate the physical models. Note - At the time this wind study was carried out, the final revision of the architectural drawings had not yet been issued, and the analysis was based on the fabricated model from the drawings available at that time. The design has since remained consistent, with no changes affecting the wind result outcomes. Therefore, the results of this report remain unchanged and are fully applicable to Appendix E Architectural Drawings Revision 01.

The recommendations and conclusions are based on the assumption that the Project Data and Climate Data are accurate and complete. RWDI assumes no responsibility for any inaccuracy or deficiency in information it has received from others. In addition, the recommendations and conclusions in this report are partially based on historical data and can be affected by a number of external factors, including but not limited to Project design, quality of materials and construction, site conditions, meteorological events, and climate change. As such, the conclusions and recommendations contained in this report do not list every possible outcome.

The opinions in this report can only be relied up on to the extent that the Project Data and Project Specific Conditions have not changed. Any change in the Project Data or Project Specific Conditions not reflected in this report can impact and/or alter the recommendations and conclusions in this report. Therefore, it is incumbent upon the Client and/or any other third party reviewing the recommendations and conclusions in this report to

contact RWDI in the event of any change in the Project Data and Project Specific Conditions in order to determine whether any such change(s) may impact the assumptions upon which the recommendations and conclusions were made.

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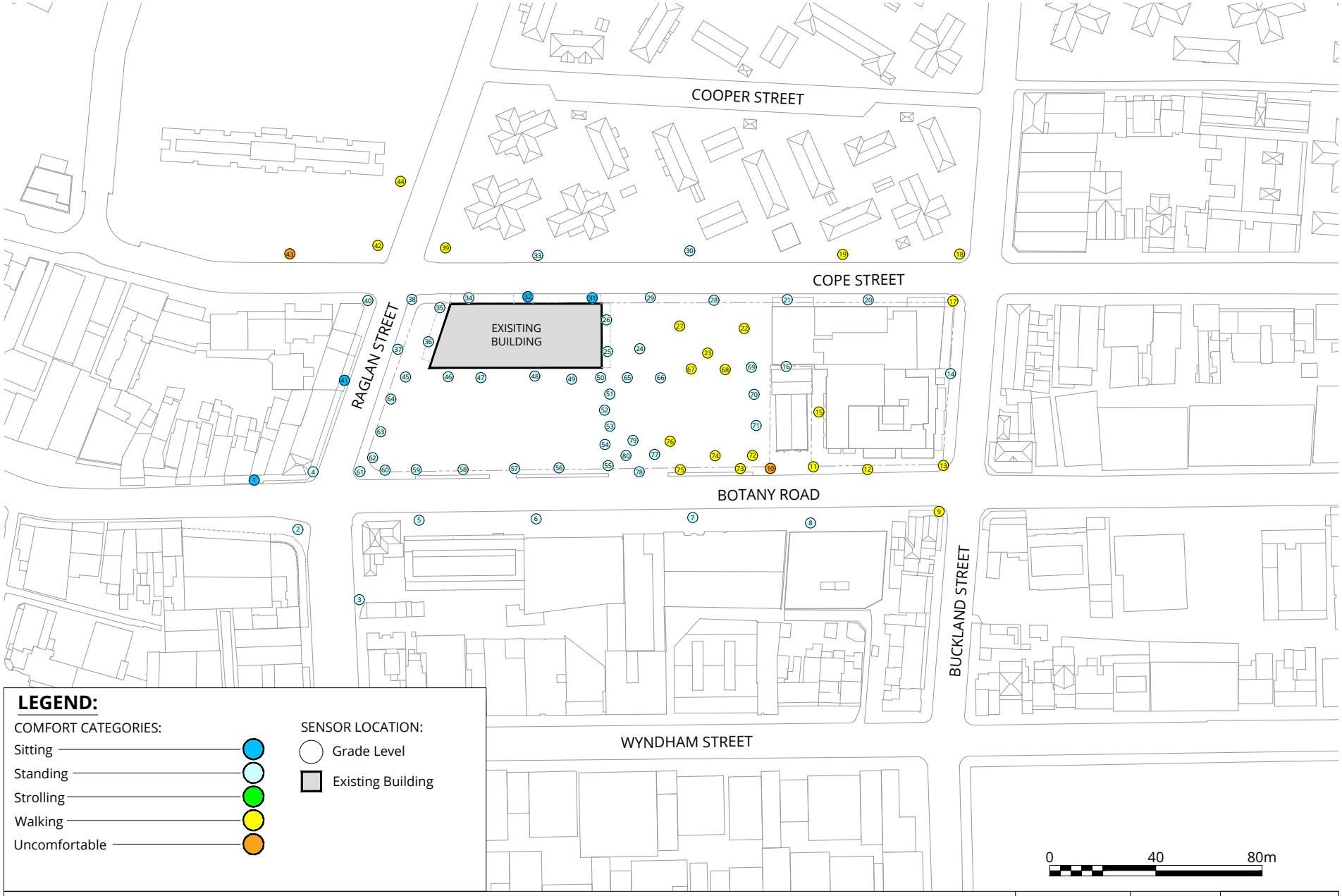
FIGURES



Pedestrian Wind Comfort Conditions

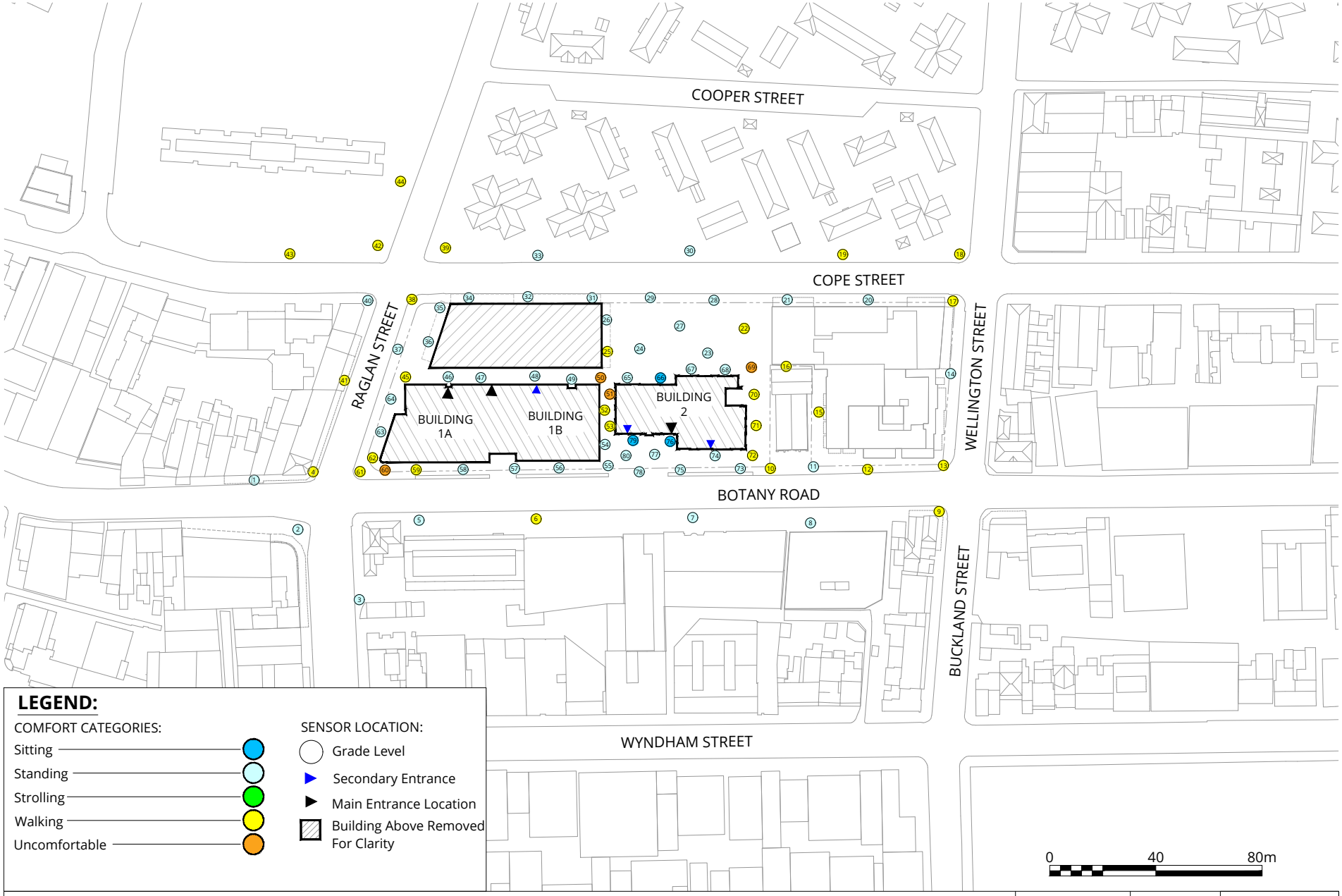
Existing Configuration - Grade
Annual (January to December, 0:00 to 23:00)

True North

Drawn by:	ASL	Figure:	1.1A
Approx. Scale:	1:2000		
Date Revised:	Sept. 11, 2025		

Waterloo Metro Quarter - Sydney NSW

Project #2511278



Pedestrian Wind Comfort Conditions

Proposed Configuration - Grade
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

Project #2511278

True North

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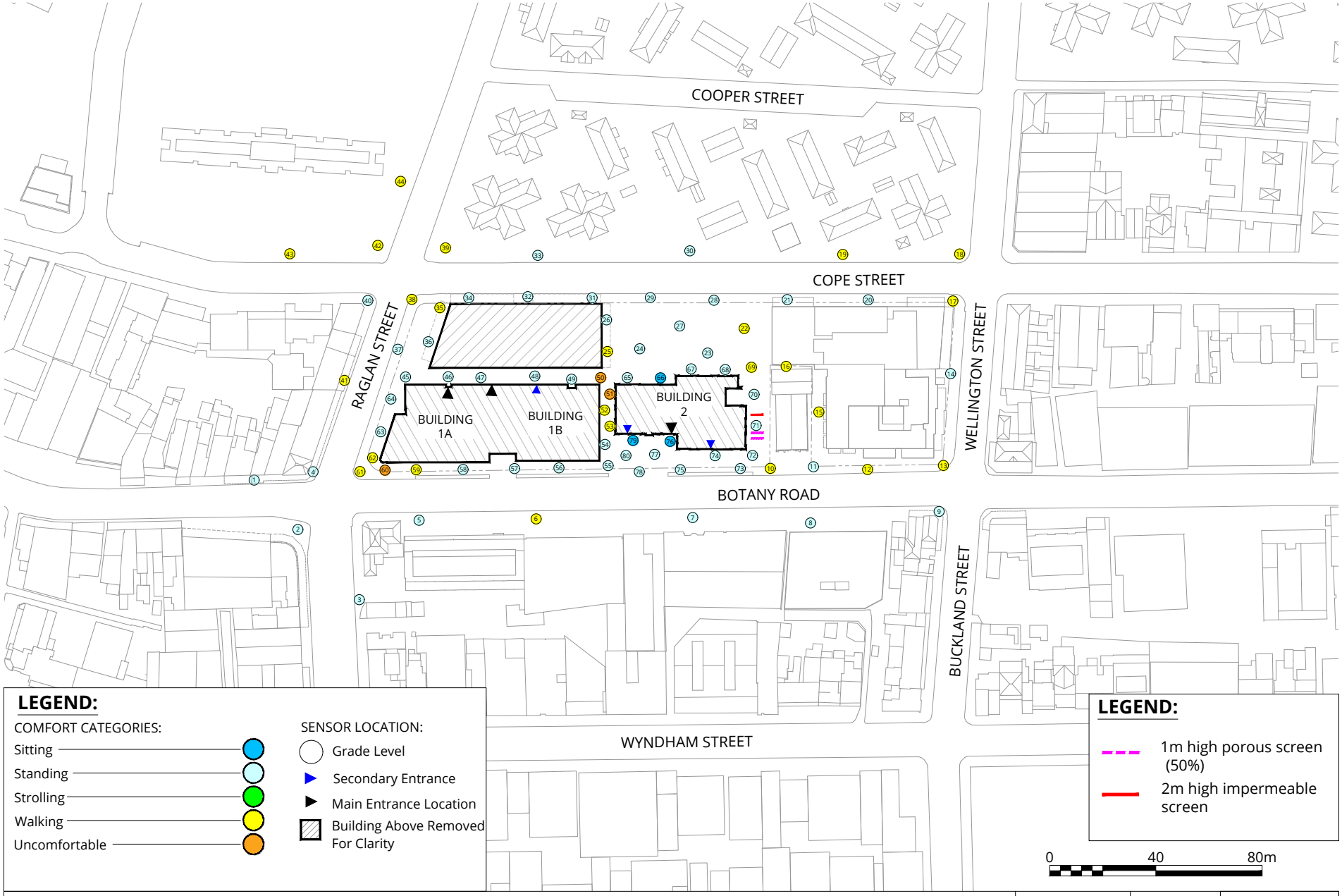
Approx. Scale:	1:2000		
Date Revised:	Sept. 11, 2025		



LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Secondary Entrance
- Main Entrance Location
- Building Above Removed For Clarity

LEGEND:
- 1m high porous screen (50%)
- 2m high impermeable screen

0 40 80m

Pedestrian Wind Comfort Conditions

Mitigation- Safety Configuration - Screens (Grade)
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

Project #2511278

True North

Drawn by:	ASL	Figure:	1.1C
Approx. Scale:	1:2000		
Date Revised:	Sept. 11, 2025		

Pedestrian Wind Comfort Conditions

Mitigation- Comfort Configuration - Screens + Landscaping (Grade)
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

Project #2511278

True North

Drawn by: ASL	Figure: 1.1D
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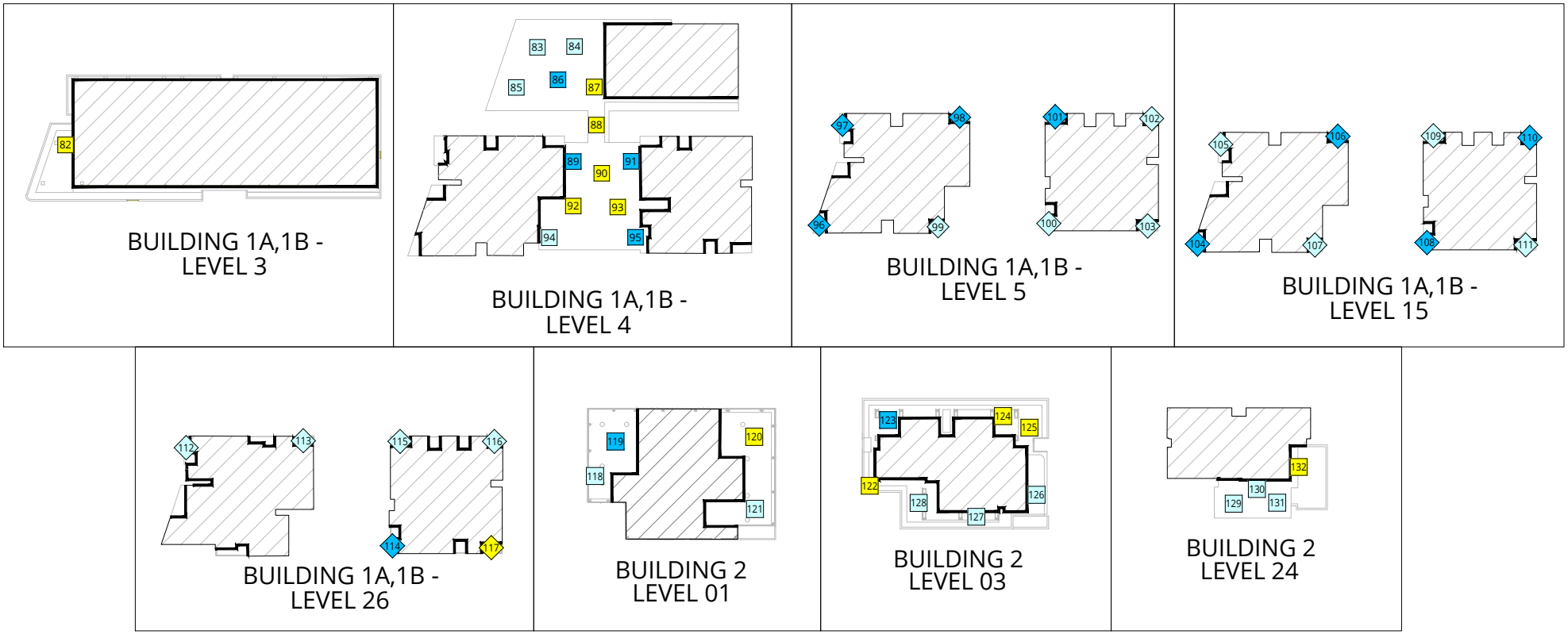
Date Revised:	Sept. 11, 2025



LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Terraces
- Balconies
- Building Above Removed For Clarity

0 30 60m

Pedestrian Wind Comfort Conditions

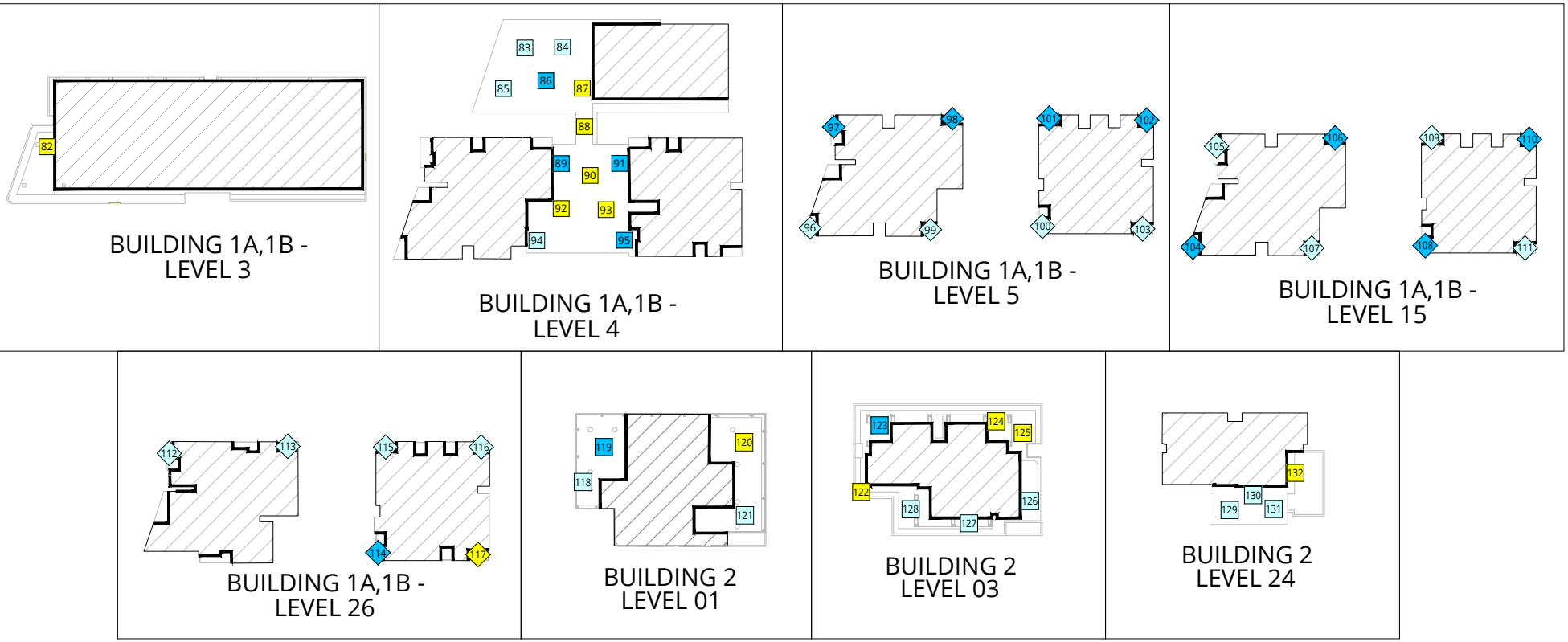
Proposed Configuration
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	1.2B
Approx. Scale:	1:1500		
Date Revised:	Sept. 11, 2025		



LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Terraces
- Balconies
- Building Above Removed For Clarity

0 30 60m

Pedestrian Wind Comfort Conditions

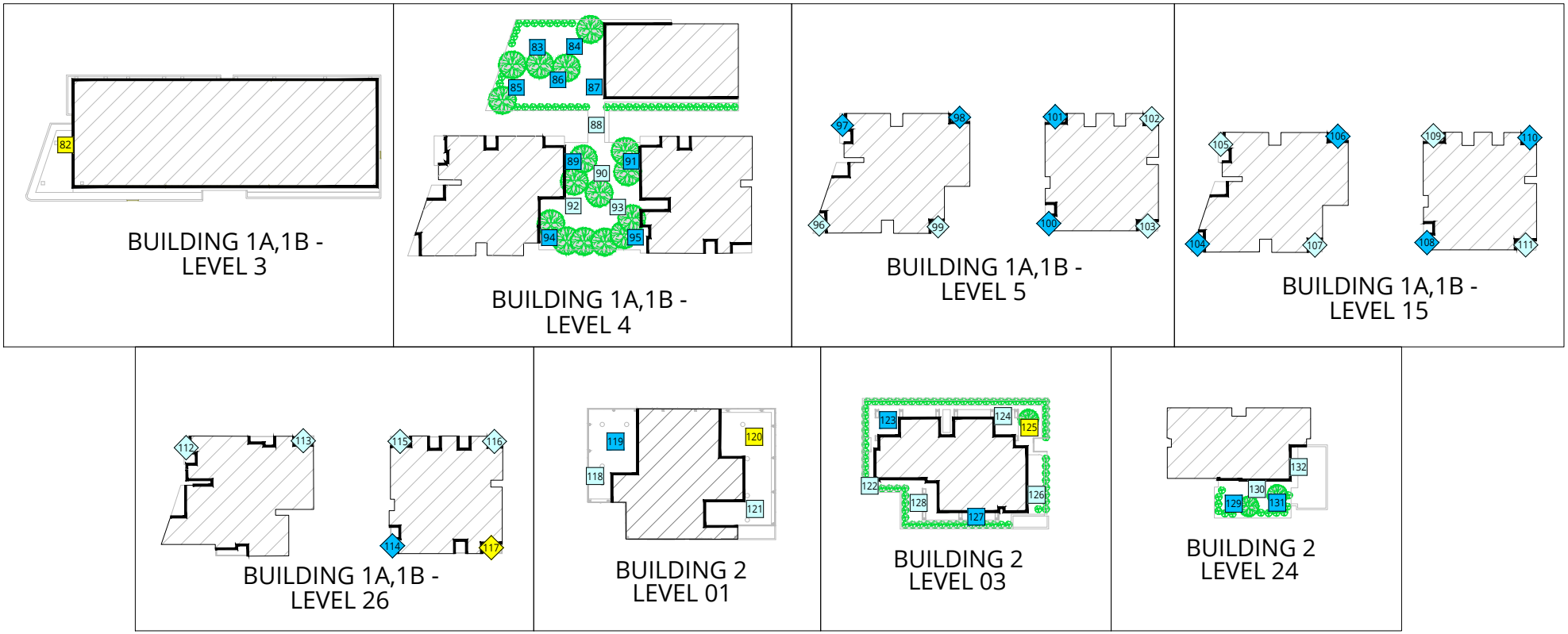
Mitigation- Safety Configuration - Screens (Grade)
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	1.2C
Approx. Scale:	1:1500		
Date Revised:	Sept. 11, 2025		



LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Strolling
- Walking
- Uncomfortable

SENSOR LOCATION:

- Terraces
- Balconies
- Building Above Removed For Clarity

LEGEND:

- Shrubs
- Trees 7m

0 30 60m

Pedestrian Wind Comfort Conditions

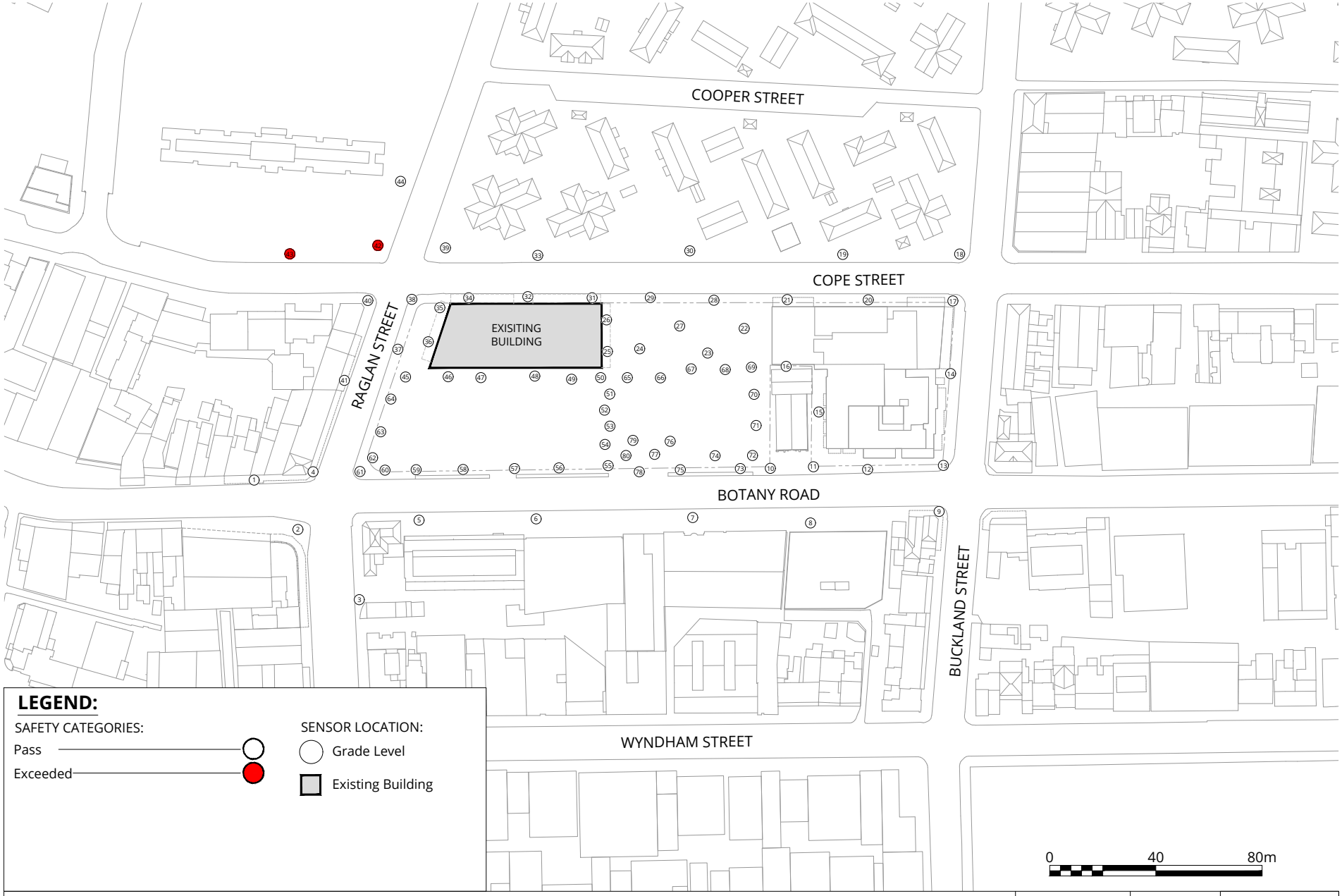
Mitigation Comfort Configuration - Screens + Landscaping (Grade)
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	1.2D
Approx. Scale:	1:1500		
Date Revised:	Sept. 11, 2025		



Pedestrian Wind Safety Conditions

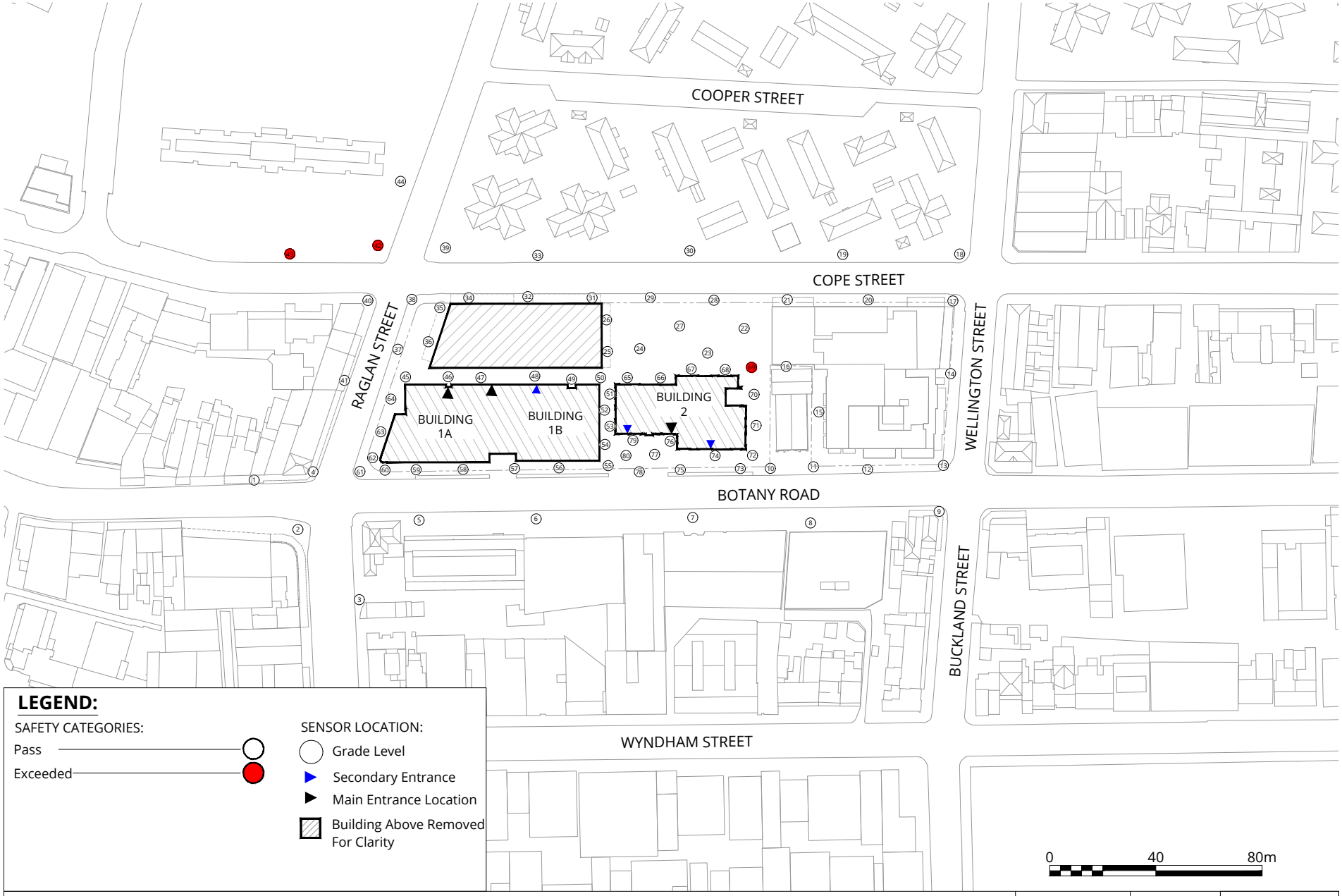
Existing Configuration - Grade
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	2.1A
Approx. Scale:	1:2000		
Date Revised:	Sept. 11, 2025		



Pedestrian Wind Safety Conditions

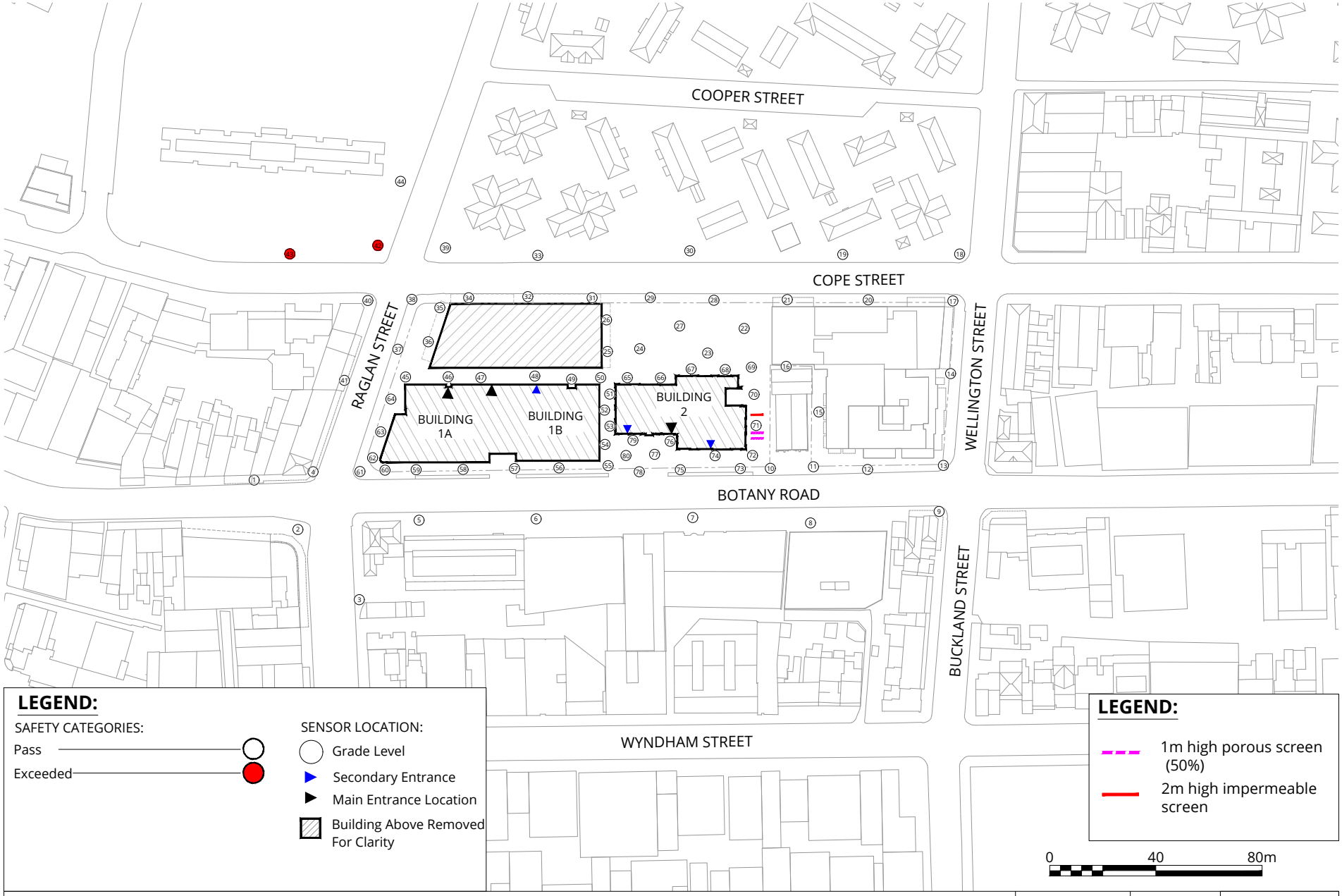
Proposed Configuration - Grade
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	2.1B
Approx. Scale:	1:2000		
Date Revised:	Sept. 11, 2025		



LEGEND:

SAFETY CATEGORIES:
- Pass
- Exceeded

SENSOR LOCATION:
- Grade Level
- Secondary Entrance
- Main Entrance Location
- Building Above Removed For Clarity

LEGEND:
- 1m high porous screen (50%)
- 2m high impermeable screen

0 40 80m

Pedestrian Wind Safety Conditions

Mitigation- Safety Configuration - Screens (Grade)
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

Project #2511278

True North

Drawn by:	ASL	Figure:	2.1C
Approx. Scale:	1:2000		
Date Revised:	Sept. 11, 2025		

Pedestrian Wind Safety Conditions

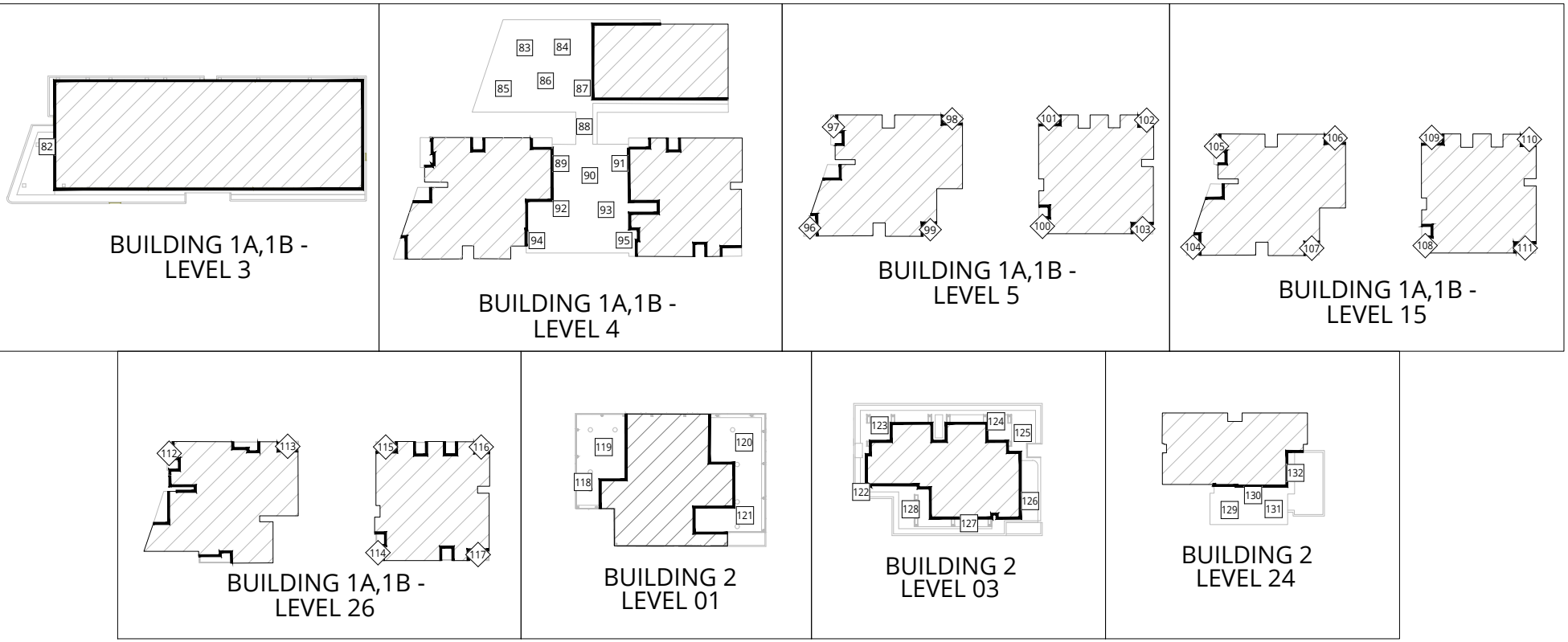
Mitigation- Comfort Configuration - Screens + Landscaping (Grade)
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

Project #2511278

True North

Drawn by: ASL	Figure: 2.1D
Approx. Scale:	1:2000
Date Revised:	Sept. 11, 2025



LEGEND:

SAFETY CATEGORIES:

Pass

Exceeded

SENSOR LOCATION:

Terraces

Balconies

Building Above Removed For Clarity

0 30 60m

Pedestrian Wind Safety Conditions

Proposed Configuration

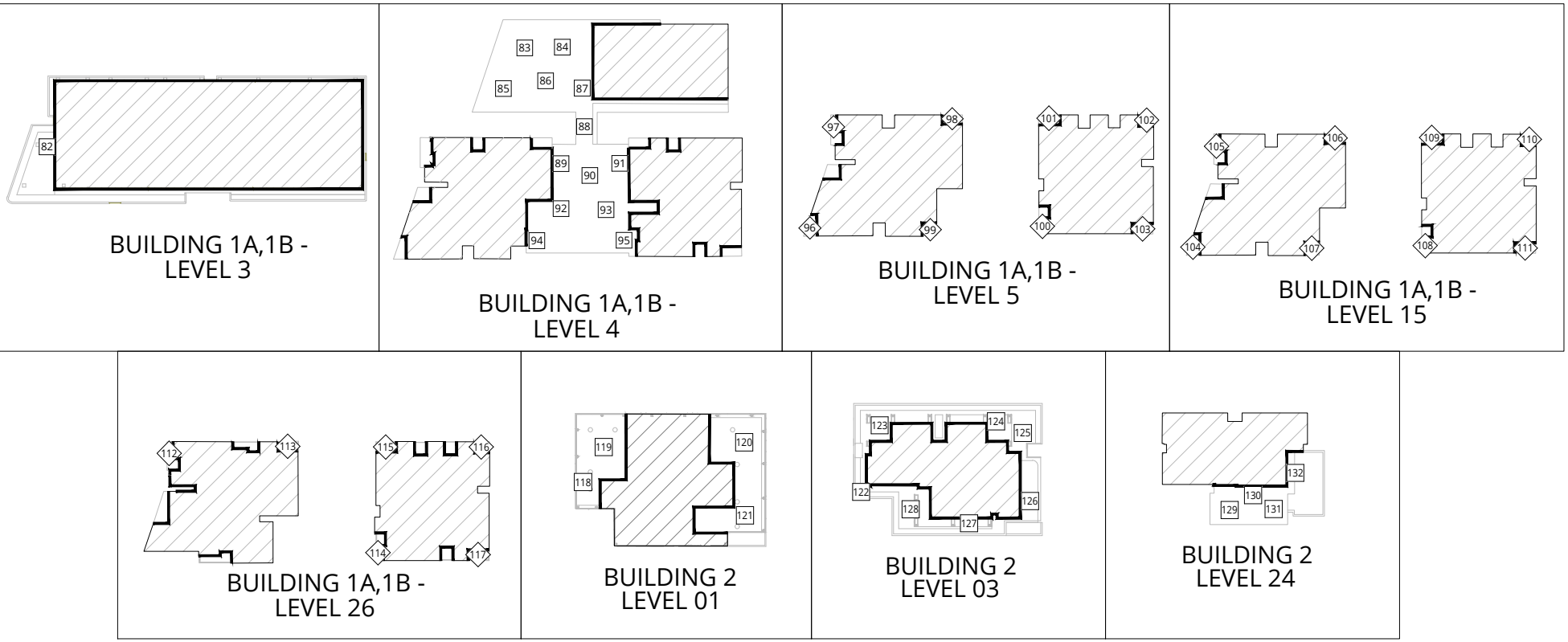
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	2.2B
Approx. Scale:	1:1500		
Date Revised:	Sept. 11, 2025		



LEGEND:

SAFETY CATEGORIES:

Pass

Exceeded

SENSOR LOCATION:

Terraces

Balconies

Building Above Removed For Clarity

0 30 60m

Pedestrian Wind Safety Conditions

Mitigation- Safety Configuration - Screens

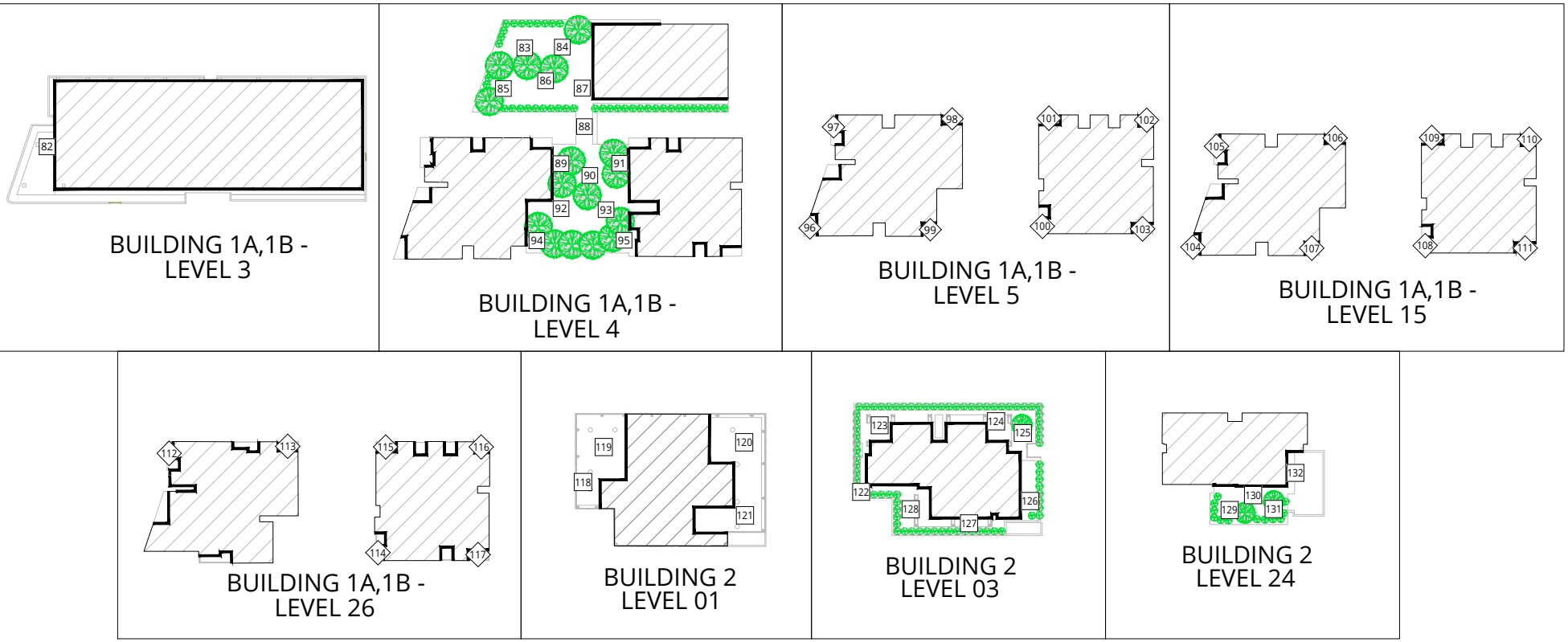
Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	2.2C
Approx. Scale:	1:1500		
Date Revised:	Sept. 11, 2025		



LEGEND:

SAFETY CATEGORIES:

Pass

Exceeded

SENSOR LOCATION:

Terraces

Balconies

Building Above Removed For Clarity

LEGEND:

Shrubs

Trees 7m

0 30 60m

Pedestrian Wind Safety Conditions

Mitigation- Comfort Configuration - Screens + Landscaping

Annual (January to December, 0:00 to 23:00)

Waterloo Metro Quarter - Sydney NSW

True North

Project #2511278

Drawn by:	ASL	Figure:	2.2D
Approx. Scale:	1:1500		
Date Revised:	Sept. 11, 2025		

TABLES

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
1	Annual	Existing	4.0	Sitting	12	Pass
	Annual	Proposed	5.1	Standing	16	Pass
	Annual	Screens	5.1	Standing	16	Pass
	Annual	Screens + Landscaping	4.2	Standing	13	Pass
2	Annual	Existing	4.9	Standing	15	Pass
	Annual	Proposed	5.7	Standing	17	Pass
	Annual	Screens	5.7	Standing	16	Pass
	Annual	Screens + Landscaping	5.8	Standing	16	Pass
3	Annual	Existing	4.2	Standing	13	Pass
	Annual	Proposed	4.6	Standing	14	Pass
	Annual	Screens	4.5	Standing	14	Pass
	Annual	Screens + Landscaping	4.5	Standing	14	Pass
4	Annual	Existing	5.0	Standing	16	Pass
	Annual	Proposed	6.1	Walking	19	Pass
	Annual	Screens	6.0	Standing	19	Pass
	Annual	Screens + Landscaping	3.9	Sitting	12	Pass
5	Annual	Existing	4.2	Standing	12	Pass
	Annual	Proposed	5.5	Standing	15	Pass
	Annual	Screens	5.6	Standing	15	Pass
	Annual	Screens + Landscaping	5.1	Standing	15	Pass
6	Annual	Existing	5.1	Standing	15	Pass
	Annual	Proposed	6.3	Walking	18	Pass
	Annual	Screens	6.3	Walking	18	Pass
	Annual	Screens + Landscaping	4.5	Standing	14	Pass
7	Annual	Existing	5.6	Standing	16	Pass
	Annual	Proposed	5.6	Standing	16	Pass
	Annual	Screens	5.7	Standing	16	Pass
	Annual	Screens + Landscaping	4.9	Standing	15	Pass
8	Annual	Existing	5.6	Standing	17	Pass
	Annual	Proposed	5.1	Standing	16	Pass
	Annual	Screens	5.2	Standing	16	Pass
	Annual	Screens + Landscaping	5.2	Standing	16	Pass
9	Annual	Existing	6.4	Walking	19	Pass
	Annual	Proposed	6.1	Walking	19	Pass
	Annual	Screens	5.8	Standing	17	Pass
	Annual	Screens + Landscaping	5.6	Standing	18	Pass
10	Annual	Existing	8.5	Uncomfortable	24	Pass
	Annual	Proposed	7.3	Walking	22	Pass
	Annual	Screens	7.0	Walking	21	Pass
	Annual	Screens + Landscaping	4.9	Standing	14	Pass
11	Annual	Existing	6.2	Walking	18	Pass
	Annual	Proposed	5.9	Standing	17	Pass
	Annual	Screens	5.9	Standing	17	Pass
	Annual	Screens + Landscaping	4.8	Standing	14	Pass
12	Annual	Existing	6.8	Walking	20	Pass
	Annual	Proposed	6.7	Walking	20	Pass
	Annual	Screens	6.9	Walking	21	Pass
	Annual	Screens + Landscaping	4.0	Sitting	13	Pass
13	Annual	Existing	7.5	Walking	21	Pass
	Annual	Proposed	7.4	Walking	20	Pass
	Annual	Screens	7.1	Walking	20	Pass
	Annual	Screens + Landscaping	5.4	Standing	15	Pass
14	Annual	Existing	5.1	Standing	16	Pass
	Annual	Proposed	4.7	Standing	15	Pass
	Annual	Screens	4.5	Standing	15	Pass
	Annual	Screens + Landscaping	4.5	Standing	15	Pass
15	Annual	Existing	8.0	Walking	23	Pass
	Annual	Proposed	6.7	Walking	21	Pass
	Annual	Screens	6.5	Walking	19	Pass
	Annual	Screens + Landscaping	5.4	Standing	16	Pass
16	Annual	Existing	4.3	Standing	14	Pass
	Annual	Proposed	6.2	Walking	18	Pass
	Annual	Screens	6.1	Walking	18	Pass
	Annual	Screens + Landscaping	5.1	Standing	16	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
17	Annual	Existing	7.6	Walking	20	Pass
	Annual	Proposed	7.2	Walking	19	Pass
	Annual	Screens	6.8	Walking	19	Pass
	Annual	Screens + Landscaping	6.7	Walking	19	Pass
18	Annual	Existing	7.7	Walking	21	Pass
	Annual	Proposed	7.3	Walking	20	Pass
	Annual	Screens	6.8	Walking	19	Pass
	Annual	Screens + Landscaping	6.5	Walking	19	Pass
19	Annual	Existing	7.3	Walking	22	Pass
	Annual	Proposed	6.5	Walking	20	Pass
	Annual	Screens	6.6	Walking	21	Pass
	Annual	Screens + Landscaping	5.2	Standing	16	Pass
20	Annual	Existing	4.5	Standing	14	Pass
	Annual	Proposed	4.3	Standing	13	Pass
	Annual	Screens	4.5	Standing	14	Pass
	Annual	Screens + Landscaping	4.3	Standing	13	Pass
21	Annual	Existing	5.5	Standing	15	Pass
	Annual	Proposed	4.7	Standing	14	Pass
	Annual	Screens	4.6	Standing	14	Pass
	Annual	Screens + Landscaping	4.9	Standing	15	Pass
22	Annual	Existing	7.2	Walking	22	Pass
	Annual	Proposed	7.2	Walking	22	Pass
	Annual	Screens	6.8	Walking	22	Pass
	Annual	Screens + Landscaping	4.8	Standing	14	Pass
23	Annual	Existing	6.6	Walking	20	Pass
	Annual	Proposed	5.1	Standing	16	Pass
	Annual	Screens	4.6	Standing	14	Pass
	Annual	Screens + Landscaping	4.6	Standing	15	Pass
24	Annual	Existing	6.0	Standing	18	Pass
	Annual	Proposed	4.9	Standing	15	Pass
	Annual	Screens	4.8	Standing	15	Pass
	Annual	Screens + Landscaping	3.8	Sitting	11	Pass
25	Annual	Existing	4.7	Standing	15	Pass
	Annual	Proposed	7.1	Walking	20	Pass
	Annual	Screens	7.0	Walking	20	Pass
	Annual	Screens + Landscaping	7.0	Walking	20	Pass
26	Annual	Existing	5.5	Standing	19	Pass
	Annual	Proposed	5.9	Standing	19	Pass
	Annual	Screens	6.0	Standing	19	Pass
	Annual	Screens + Landscaping	5.8	Standing	18	Pass
27	Annual	Existing	6.4	Walking	19	Pass
	Annual	Proposed	5.1	Standing	15	Pass
	Annual	Screens	5.1	Standing	14	Pass
	Annual	Screens + Landscaping	4.3	Standing	12	Pass
28	Annual	Existing	5.1	Standing	15	Pass
	Annual	Proposed	4.6	Standing	13	Pass
	Annual	Screens	4.4	Standing	13	Pass
	Annual	Screens + Landscaping	4.6	Standing	12	Pass
29	Annual	Existing	5.8	Standing	19	Pass
	Annual	Proposed	5.2	Standing	17	Pass
	Annual	Screens	5.1	Standing	16	Pass
	Annual	Screens + Landscaping	4.2	Standing	14	Pass
30	Annual	Existing	5.4	Standing	18	Pass
	Annual	Proposed	5.0	Standing	15	Pass
	Annual	Screens	4.8	Standing	15	Pass
	Annual	Screens + Landscaping	4.2	Standing	13	Pass
31	Annual	Existing	4.0	Sitting	12	Pass
	Annual	Proposed	4.5	Standing	14	Pass
	Annual	Screens	4.4	Standing	13	Pass
	Annual	Screens + Landscaping	3.7	Sitting	12	Pass
32	Annual	Existing	4.0	Sitting	13	Pass
	Annual	Proposed	4.2	Standing	13	Pass
	Annual	Screens	4.2	Standing	13	Pass
	Annual	Screens + Landscaping	3.7	Sitting	14	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
33	Annual	Existing	5.1	Standing	15	Pass
	Annual	Proposed	5.8	Standing	18	Pass
	Annual	Screens	5.7	Standing	18	Pass
	Annual	Screens + Landscaping	4.6	Standing	16	Pass
34	Annual	Existing	4.3	Standing	13	Pass
	Annual	Proposed	4.5	Standing	13	Pass
	Annual	Screens	4.4	Standing	13	Pass
	Annual	Screens + Landscaping	4.0	Sitting	12	Pass
35	Annual	Existing	4.5	Standing	14	Pass
	Annual	Proposed	6.0	Standing	18	Pass
	Annual	Screens	6.1	Walking	18	Pass
	Annual	Screens + Landscaping	5.4	Standing	17	Pass
36	Annual	Existing	4.4	Standing	13	Pass
	Annual	Proposed	5.7	Standing	17	Pass
	Annual	Screens	5.8	Standing	17	Pass
	Annual	Screens + Landscaping	5.2	Standing	15	Pass
37	Annual	Existing	5.2	Standing	16	Pass
	Annual	Proposed	6.0	Standing	19	Pass
	Annual	Screens	6.0	Standing	19	Pass
	Annual	Screens + Landscaping	5.4	Standing	16	Pass
38	Annual	Existing	5.0	Standing	14	Pass
	Annual	Proposed	6.2	Walking	18	Pass
	Annual	Screens	6.2	Walking	18	Pass
	Annual	Screens + Landscaping	5.4	Standing	16	Pass
39	Annual	Existing	6.5	Walking	23	Pass
	Annual	Proposed	6.7	Walking	23	Pass
	Annual	Screens	6.7	Walking	23	Pass
	Annual	Screens + Landscaping	6.2	Walking	21	Pass
40	Annual	Existing	5.6	Standing	17	Pass
	Annual	Proposed	4.8	Standing	14	Pass
	Annual	Screens	4.8	Standing	14	Pass
	Annual	Screens + Landscaping	4.7	Standing	15	Pass
41	Annual	Existing	3.7	Sitting	12	Pass
	Annual	Proposed	7.5	Walking	21	Pass
	Annual	Screens	7.4	Walking	21	Pass
	Annual	Screens + Landscaping	5.0	Standing	15	Pass
42	Annual	Existing	7.6	Walking	25	Exceeded
	Annual	Proposed	7.8	Walking	26	Exceeded
	Annual	Screens	7.7	Walking	25	Exceeded
	Annual	Screens + Landscaping	5.8	Standing	17	Pass
43	Annual	Existing	8.2	Uncomfortable	25	Exceeded
	Annual	Proposed	8.0	Walking	25	Exceeded
	Annual	Screens	8.0	Walking	25	Exceeded
	Annual	Screens + Landscaping	7.5	Walking	24	Pass
44	Annual	Existing	6.9	Walking	23	Pass
	Annual	Proposed	6.8	Walking	23	Pass
	Annual	Screens	6.8	Walking	23	Pass
	Annual	Screens + Landscaping	6.8	Walking	22	Pass
45	Annual	Existing	6.0	Standing	19	Pass
	Annual	Proposed	6.1	Walking	20	Pass
	Annual	Screens	5.9	Standing	20	Pass
	Annual	Screens + Landscaping	5.4	Standing	17	Pass
46	Annual	Existing	5.7	Standing	18	Pass
	Annual	Proposed	5.6	Standing	20	Pass
	Annual	Screens	5.7	Standing	20	Pass
	Annual	Screens + Landscaping	5.0	Standing	16	Pass
47	Annual	Existing	5.8	Standing	19	Pass
	Annual	Proposed	5.1	Standing	16	Pass
	Annual	Screens	5.3	Standing	16	Pass
	Annual	Screens + Landscaping	5.1	Standing	15	Pass
48	Annual	Existing	5.4	Standing	17	Pass
	Annual	Proposed	5.2	Standing	15	Pass
	Annual	Screens	5.3	Standing	15	Pass
	Annual	Screens + Landscaping	5.2	Standing	14	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
49	Annual	Existing	5.0	Standing	16	Pass
	Annual	Proposed	5.2	Standing	15	Pass
	Annual	Screens	5.3	Standing	15	Pass
	Annual	Screens + Landscaping	4.7	Standing	14	Pass
50	Annual	Existing	5.7	Standing	18	Pass
	Annual	Proposed	8.5	Uncomfortable	21	Pass
	Annual	Screens	8.5	Uncomfortable	21	Pass
	Annual	Screens + Landscaping	7.8	Walking	20	Pass
51	Annual	Existing	5.6	Standing	17	Pass
	Annual	Proposed	8.3	Uncomfortable	21	Pass
	Annual	Screens	8.2	Uncomfortable	21	Pass
	Annual	Screens + Landscaping	8.0	Walking	20	Pass
52	Annual	Existing	5.8	Standing	17	Pass
	Annual	Proposed	8.0	Walking	20	Pass
	Annual	Screens	7.9	Walking	20	Pass
	Annual	Screens + Landscaping	7.2	Walking	18	Pass
53	Annual	Existing	5.8	Standing	17	Pass
	Annual	Proposed	7.5	Walking	20	Pass
	Annual	Screens	7.4	Walking	20	Pass
	Annual	Screens + Landscaping	6.7	Walking	18	Pass
54	Annual	Existing	5.7	Standing	17	Pass
	Annual	Proposed	5.5	Standing	17	Pass
	Annual	Screens	5.5	Standing	18	Pass
	Annual	Screens + Landscaping	5.1	Standing	14	Pass
55	Annual	Existing	5.7	Standing	17	Pass
	Annual	Proposed	5.9	Standing	20	Pass
	Annual	Screens	5.8	Standing	20	Pass
	Annual	Screens + Landscaping	5.0	Standing	16	Pass
56	Annual	Existing	5.4	Standing	16	Pass
	Annual	Proposed	5.5	Standing	17	Pass
	Annual	Screens	5.5	Standing	17	Pass
	Annual	Screens + Landscaping	3.7	Sitting	13	Pass
57	Annual	Existing	5.0	Standing	15	Pass
	Annual	Proposed	5.2	Standing	15	Pass
	Annual	Screens	5.1	Standing	15	Pass
	Annual	Screens + Landscaping	3.8	Sitting	12	Pass
58	Annual	Existing	4.9	Standing	14	Pass
	Annual	Proposed	6.0	Standing	17	Pass
	Annual	Screens	6.0	Standing	17	Pass
	Annual	Screens + Landscaping	4.6	Standing	14	Pass
59	Annual	Existing	4.7	Standing	14	Pass
	Annual	Proposed	6.8	Walking	19	Pass
	Annual	Screens	6.8	Walking	19	Pass
	Annual	Screens + Landscaping	5.6	Standing	16	Pass
60	Annual	Existing	4.5	Standing	13	Pass
	Annual	Proposed	9.0	Uncomfortable	24	Pass
	Annual	Screens	8.8	Uncomfortable	24	Pass
	Annual	Screens + Landscaping	6.7	Walking	18	Pass
61	Annual	Existing	4.4	Standing	13	Pass
	Annual	Proposed	7.7	Walking	20	Pass
	Annual	Screens	7.7	Walking	20	Pass
	Annual	Screens + Landscaping	4.5	Standing	12	Pass
62	Annual	Existing	4.3	Standing	13	Pass
	Annual	Proposed	6.3	Walking	21	Pass
	Annual	Screens	6.2	Walking	21	Pass
	Annual	Screens + Landscaping	4.5	Standing	15	Pass
63	Annual	Existing	4.6	Standing	13	Pass
	Annual	Proposed	5.8	Standing	17	Pass
	Annual	Screens	5.7	Standing	16	Pass
	Annual	Screens + Landscaping	5.3	Standing	15	Pass
64	Annual	Existing	4.9	Standing	15	Pass
	Annual	Proposed	5.3	Standing	19	Pass
	Annual	Screens	5.2	Standing	19	Pass
	Annual	Screens + Landscaping	4.1	Standing	12	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
65	Annual	Existing	5.7	Standing	17	Pass
	Annual	Proposed	4.7	Standing	14	Pass
	Annual	Screens	4.7	Standing	14	Pass
	Annual	Screens + Landscaping	4.4	Standing	14	Pass
66	Annual	Existing	5.9	Standing	18	Pass
	Annual	Proposed	3.5	Sitting	10	Pass
	Annual	Screens	3.4	Sitting	10	Pass
	Annual	Screens + Landscaping	3.2	Sitting	10	Pass
67	Annual	Existing	6.3	Walking	19	Pass
	Annual	Proposed	4.7	Standing	14	Pass
	Annual	Screens	4.2	Standing	13	Pass
	Annual	Screens + Landscaping	3.8	Sitting	12	Pass
68	Annual	Existing	6.2	Walking	19	Pass
	Annual	Proposed	4.8	Standing	14	Pass
	Annual	Screens	4.3	Standing	13	Pass
	Annual	Screens + Landscaping	4.8	Standing	14	Pass
69	Annual	Existing	5.8	Standing	19	Pass
	Annual	Proposed	8.9	Uncomfortable	25	Exceeded
	Annual	Screens	7.6	Walking	22	Pass
	Annual	Screens + Landscaping	5.9	Standing	18	Pass
70	Annual	Existing	5.1	Standing	15	Pass
	Annual	Proposed	7.1	Walking	20	Pass
	Annual	Screens	4.9	Standing	15	Pass
	Annual	Screens + Landscaping	5.1	Standing	17	Pass
71	Annual	Existing	5.4	Standing	15	Pass
	Annual	Proposed	6.9	Walking	19	Pass
	Annual	Screens	5.1	Standing	15	Pass
	Annual	Screens + Landscaping	3.2	Sitting	10	Pass
72	Annual	Existing	7.2	Walking	21	Pass
	Annual	Proposed	6.5	Walking	19	Pass
	Annual	Screens	5.9	Standing	18	Pass
	Annual	Screens + Landscaping	4.0	Sitting	11	Pass
73	Annual	Existing	7.7	Walking	21	Pass
	Annual	Proposed	5.9	Standing	18	Pass
	Annual	Screens	5.9	Standing	18	Pass
	Annual	Screens + Landscaping	3.8	Sitting	11	Pass
74	Annual	Existing	7.0	Walking	21	Pass
	Annual	Proposed	5.2	Standing	16	Pass
	Annual	Screens	5.2	Standing	16	Pass
	Annual	Screens + Landscaping	4.2	Standing	13	Pass
75	Annual	Existing	6.8	Walking	20	Pass
	Annual	Proposed	5.9	Standing	18	Pass
	Annual	Screens	5.9	Standing	18	Pass
	Annual	Screens + Landscaping	2.7	Sitting	9	Pass
76	Annual	Existing	6.1	Walking	18	Pass
	Annual	Proposed	2.8	Sitting	11	Pass
	Annual	Screens	2.8	Sitting	11	Pass
	Annual	Screens + Landscaping	2.6	Sitting	11	Pass
77	Annual	Existing	6.0	Standing	18	Pass
	Annual	Proposed	5.2	Standing	16	Pass
	Annual	Screens	5.1	Standing	16	Pass
	Annual	Screens + Landscaping	2.9	Sitting	11	Pass
78	Annual	Existing	5.8	Standing	17	Pass
	Annual	Proposed	5.7	Standing	17	Pass
	Annual	Screens	5.7	Standing	17	Pass
	Annual	Screens + Landscaping	3.4	Sitting	11	Pass
79	Annual	Existing	5.5	Standing	16	Pass
	Annual	Proposed	3.9	Sitting	12	Pass
	Annual	Screens	3.9	Sitting	12	Pass
	Annual	Screens + Landscaping	4.1	Standing	14	Pass
80	Annual	Existing	5.8	Standing	17	Pass
	Annual	Proposed	5.2	Standing	15	Pass
	Annual	Screens	5.2	Standing	16	Pass
	Annual	Screens + Landscaping	4.2	Standing	15	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
82	Annual	Existing	-	-	-	-
	Annual	Proposed	6.8	Walking	19	Pass
	Annual	Screens	6.7	Walking	19	Pass
	Annual	Screens + Landscaping	6.5	Walking	18	Pass
83	Annual	Existing	-	-	-	-
	Annual	Proposed	5.1	Standing	16	Pass
	Annual	Screens	5.1	Standing	16	Pass
	Annual	Screens + Landscaping	4.0	Sitting	12	Pass
84	Annual	Existing	-	-	-	-
	Annual	Proposed	4.4	Standing	13	Pass
	Annual	Screens	4.4	Standing	14	Pass
	Annual	Screens + Landscaping	3.4	Sitting	10	Pass
85	Annual	Existing	-	-	-	-
	Annual	Proposed	4.3	Standing	13	Pass
	Annual	Screens	4.3	Standing	13	Pass
	Annual	Screens + Landscaping	3.4	Sitting	10	Pass
86	Annual	Existing	-	-	-	-
	Annual	Proposed	3.9	Sitting	12	Pass
	Annual	Screens	3.9	Sitting	12	Pass
	Annual	Screens + Landscaping	3.5	Sitting	10	Pass
87	Annual	Existing	-	-	-	-
	Annual	Proposed	7.0	Walking	21	Pass
	Annual	Screens	7.0	Walking	21	Pass
	Annual	Screens + Landscaping	3.8	Sitting	11	Pass
88	Annual	Existing	-	-	-	-
	Annual	Proposed	7.3	Walking	22	Pass
	Annual	Screens	7.2	Walking	22	Pass
	Annual	Screens + Landscaping	5.2	Standing	15	Pass
89	Annual	Existing	-	-	-	-
	Annual	Proposed	3.1	Sitting	9	Pass
	Annual	Screens	3.2	Sitting	9	Pass
	Annual	Screens + Landscaping	3.2	Sitting	10	Pass
90	Annual	Existing	-	-	-	-
	Annual	Proposed	6.5	Walking	18	Pass
	Annual	Screens	6.5	Walking	18	Pass
	Annual	Screens + Landscaping	5.7	Standing	15	Pass
91	Annual	Existing	-	-	-	-
	Annual	Proposed	3.9	Sitting	13	Pass
	Annual	Screens	3.9	Sitting	13	Pass
	Annual	Screens + Landscaping	3.4	Sitting	10	Pass
92	Annual	Existing	-	-	-	-
	Annual	Proposed	6.7	Walking	19	Pass
	Annual	Screens	6.7	Walking	19	Pass
	Annual	Screens + Landscaping	5.9	Standing	16	Pass
93	Annual	Existing	-	-	-	-
	Annual	Proposed	7.5	Walking	22	Pass
	Annual	Screens	7.5	Walking	22	Pass
	Annual	Screens + Landscaping	5.7	Standing	15	Pass
94	Annual	Existing	-	-	-	-
	Annual	Proposed	4.4	Standing	13	Pass
	Annual	Screens	4.5	Standing	13	Pass
	Annual	Screens + Landscaping	3.9	Sitting	12	Pass
95	Annual	Existing	-	-	-	-
	Annual	Proposed	4.0	Sitting	12	Pass
	Annual	Screens	4.0	Sitting	12	Pass
	Annual	Screens + Landscaping	4.0	Sitting	13	Pass
96	Annual	Existing	-	-	-	-
	Annual	Proposed	4.0	Sitting	12	Pass
	Annual	Screens	4.1	Standing	12	Pass
	Annual	Screens + Landscaping	4.1	Standing	12	Pass
97	Annual	Existing	-	-	-	-
	Annual	Proposed	2.5	Sitting	8	Pass
	Annual	Screens	2.5	Sitting	8	Pass
	Annual	Screens + Landscaping	2.5	Sitting	8	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
98	Annual	Existing	-	-	-	-
	Annual	Proposed	3.2	Sitting	9	Pass
	Annual	Screens	3.3	Sitting	10	Pass
	Annual	Screens + Landscaping	2.4	Sitting	8	Pass
99	Annual	Existing	-	-	-	-
	Annual	Proposed	4.9	Standing	16	Pass
	Annual	Screens	5.0	Standing	16	Pass
	Annual	Screens + Landscaping	5.2	Standing	18	Pass
100	Annual	Existing	-	-	-	-
	Annual	Proposed	4.8	Standing	18	Pass
	Annual	Screens	4.8	Standing	18	Pass
	Annual	Screens + Landscaping	3.7	Sitting	13	Pass
101	Annual	Existing	-	-	-	-
	Annual	Proposed	3.7	Sitting	12	Pass
	Annual	Screens	3.7	Sitting	12	Pass
	Annual	Screens + Landscaping	2.9	Sitting	9	Pass
102	Annual	Existing	-	-	-	-
	Annual	Proposed	4.1	Standing	12	Pass
	Annual	Screens	4.0	Sitting	12	Pass
	Annual	Screens + Landscaping	4.3	Standing	13	Pass
103	Annual	Existing	-	-	-	-
	Annual	Proposed	4.1	Standing	12	Pass
	Annual	Screens	4.2	Standing	13	Pass
	Annual	Screens + Landscaping	4.1	Standing	12	Pass
104	Annual	Existing	-	-	-	-
	Annual	Proposed	3.6	Sitting	12	Pass
	Annual	Screens	3.6	Sitting	12	Pass
	Annual	Screens + Landscaping	3.8	Sitting	13	Pass
105	Annual	Existing	-	-	-	-
	Annual	Proposed	5.0	Standing	16	Pass
	Annual	Screens	5.0	Standing	16	Pass
	Annual	Screens + Landscaping	5.0	Standing	16	Pass
106	Annual	Existing	-	-	-	-
	Annual	Proposed	3.6	Sitting	11	Pass
	Annual	Screens	3.7	Sitting	12	Pass
	Annual	Screens + Landscaping	3.6	Sitting	12	Pass
107	Annual	Existing	-	-	-	-
	Annual	Proposed	5.4	Standing	17	Pass
	Annual	Screens	5.4	Standing	17	Pass
	Annual	Screens + Landscaping	5.4	Standing	16	Pass
108	Annual	Existing	-	-	-	-
	Annual	Proposed	3.9	Sitting	15	Pass
	Annual	Screens	3.9	Sitting	15	Pass
	Annual	Screens + Landscaping	3.9	Sitting	15	Pass
109	Annual	Existing	-	-	-	-
	Annual	Proposed	5.3	Standing	15	Pass
	Annual	Screens	5.3	Standing	15	Pass
	Annual	Screens + Landscaping	5.3	Standing	15	Pass
110	Annual	Existing	-	-	-	-
	Annual	Proposed	3.7	Sitting	10	Pass
	Annual	Screens	3.6	Sitting	10	Pass
	Annual	Screens + Landscaping	3.6	Sitting	10	Pass
111	Annual	Existing	-	-	-	-
	Annual	Proposed	4.7	Standing	16	Pass
	Annual	Screens	4.7	Standing	15	Pass
	Annual	Screens + Landscaping	4.7	Standing	15	Pass
112	Annual	Existing	-	-	-	-
	Annual	Proposed	4.1	Standing	11	Pass
	Annual	Screens	4.1	Standing	11	Pass
	Annual	Screens + Landscaping	4.1	Standing	11	Pass
113	Annual	Existing	-	-	-	-
	Annual	Proposed	5.0	Standing	17	Pass
	Annual	Screens	5.4	Standing	19	Pass
	Annual	Screens + Landscaping	5.3	Standing	19	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
114	Annual	Existing	-	-	-	-
	Annual	Proposed	3.3	Sitting	14	Pass
	Annual	Screens	3.2	Sitting	14	Pass
	Annual	Screens + Landscaping	3.3	Sitting	14	Pass
115	Annual	Existing	-	-	-	-
	Annual	Proposed	5.9	Standing	17	Pass
	Annual	Screens	5.8	Standing	16	Pass
	Annual	Screens + Landscaping	5.9	Standing	17	Pass
116	Annual	Existing	-	-	-	-
	Annual	Proposed	5.2	Standing	15	Pass
	Annual	Screens	5.2	Standing	15	Pass
	Annual	Screens + Landscaping	5.2	Standing	15	Pass
117	Annual	Existing	-	-	-	-
	Annual	Proposed	6.8	Walking	20	Pass
	Annual	Screens	6.7	Walking	20	Pass
	Annual	Screens + Landscaping	6.8	Walking	20	Pass
118	Annual	Existing	-	-	-	-
	Annual	Proposed	5.6	Standing	17	Pass
	Annual	Screens	5.7	Standing	17	Pass
	Annual	Screens + Landscaping	5.4	Standing	18	Pass
119	Annual	Existing	-	-	-	-
	Annual	Proposed	3.4	Sitting	9	Pass
	Annual	Screens	3.4	Sitting	9	Pass
	Annual	Screens + Landscaping	3.3	Sitting	9	Pass
120	Annual	Existing	-	-	-	-
	Annual	Proposed	6.7	Walking	18	Pass
	Annual	Screens	6.7	Walking	18	Pass
	Annual	Screens + Landscaping	6.4	Walking	17	Pass
121	Annual	Existing	-	-	-	-
	Annual	Proposed	4.8	Standing	14	Pass
	Annual	Screens	4.7	Standing	14	Pass
	Annual	Screens + Landscaping	4.7	Standing	14	Pass
122	Annual	Existing	-	-	-	-
	Annual	Proposed	6.7	Walking	20	Pass
	Annual	Screens	6.7	Walking	20	Pass
	Annual	Screens + Landscaping	4.2	Standing	13	Pass
123	Annual	Existing	-	-	-	-
	Annual	Proposed	3.4	Sitting	10	Pass
	Annual	Screens	3.3	Sitting	10	Pass
	Annual	Screens + Landscaping	2.8	Sitting	9	Pass
124	Annual	Existing	-	-	-	-
	Annual	Proposed	7.3	Walking	21	Pass
	Annual	Screens	7.0	Walking	20	Pass
	Annual	Screens + Landscaping	5.1	Standing	15	Pass
125	Annual	Existing	-	-	-	-
	Annual	Proposed	7.8	Walking	21	Pass
	Annual	Screens	7.7	Walking	21	Pass
	Annual	Screens + Landscaping	6.6	Walking	18	Pass
126	Annual	Existing	-	-	-	-
	Annual	Proposed	5.5	Standing	16	Pass
	Annual	Screens	5.3	Standing	16	Pass
	Annual	Screens + Landscaping	5.2	Standing	16	Pass
127	Annual	Existing	-	-	-	-
	Annual	Proposed	4.4	Standing	13	Pass
	Annual	Screens	4.3	Standing	13	Pass
	Annual	Screens + Landscaping	3.0	Sitting	9	Pass
128	Annual	Existing	-	-	-	-
	Annual	Proposed	4.7	Standing	16	Pass
	Annual	Screens	4.7	Standing	16	Pass
	Annual	Screens + Landscaping	4.6	Standing	15	Pass
129	Annual	Existing	-	-	-	-
	Annual	Proposed	5.0	Standing	17	Pass
	Annual	Screens	5.0	Standing	17	Pass
	Annual	Screens + Landscaping	3.3	Sitting	11	Pass

Table A1: Pedestrian Wind Comfort and Safety Conditions

Location	Season	Configuration	Wind Comfort		Wind Safety	
			Speed (m/s)	Rating	Speed (m/s)	Rating
130	Annual	Existing	-	-	-	-
	Annual	Proposed	4.8	Standing	15	Pass
	Annual	Screens	4.7	Standing	15	Pass
	Annual	Screens + Landscaping	4.3	Standing	13	Pass
131	Annual	Existing	-	-	-	-
	Annual	Proposed	4.6	Standing	16	Pass
	Annual	Screens	4.6	Standing	15	Pass
	Annual	Screens + Landscaping	3.6	Sitting	11	Pass
132	Annual	Existing	-	-	-	-
	Annual	Proposed	6.1	Walking	20	Pass
	Annual	Screens	6.3	Walking	20	Pass
	Annual	Screens + Landscaping	5.7	Standing	17	Pass

Seasons	Months	Hours	Wind Comfort (m/s)		Wind Safety (m/s)	
Annual	January - December	6:00 - 22:00	≤ 4	Sitting	≤ 24	Pass
Annual Safety	January - December	0:00 - 23:00	≤ 6	Standing	> 24	Exceeded
			≤ 8	Walking		
			> 8	Uncomfortable		

Configurations	
Existing	Existing site and surroundings
Proposed	Project with existing surroundings
Mitigation - Safety	Project with existing surroundings + Screening
Mitigation - Comfort	Project with existing surroundings + Screening + Landscaping