

ATLASSIAN CENTRAL

SYDNEY, AUSTRALIA

PEDESTRIAN WIND STUDY

RWDI # 2100277

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SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed Atlassian Central development located on Block A of the Central Station Western Gateway Precinct in Sydney, NSW. This follows extensive engagement between various stakeholders in the Precinct to ensure that the pedestrian wind comfort levels in this changing environment are adequate, and aligned with the wind map specifically prepared for the Western Gateway Sub-Precinct.

As at the time of writing this report, the Atlassian Central (Block A) Detailed Design Development Application has come off public exhibition and this report accompanies the 'Response to Submissions', Central Place (Block B) have recently submitted a development application for the Detailed Design (which has just finalised public exhibition), and the rezoning of Toga Central (Block C) is still underway, with the proposed building envelopes still not approved or finalised by DPIE. Accordingly, there are a number of 'moving parts', with respect to the individual proposals in the Precinct, albeit that Atlassian Central is the most advanced comparative to the others.

Specifically, this wind report has been updated to reflect feedback from public exhibition, and a range of amendments to the original proposal (as lodged). The wind modelling has accounted for all of these changes which include minor changes to the building envelope. These amendments provide for wind impacts that comply with the relevant criteria for the public domain in and around the site as discussed within this report.

The pedestrian level wind assessment was conducted for six configurations:

Configuration 1:	Existing Site with Existing Surrounding Buildings;
Configuration 2:	Proposed Block A Development with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures;
Configuration 3:	Proposed Block A and B Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures;
Configuration 4:	Proposed Block A, B and C (draft envelope, subject to change) Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures;
Configuration 4A:	Proposed Block A, B and C Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping, Wind Mitigation Measures and Angled Pavilion Structure; and
Configuration 4B:	Proposed Block A, B and C Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping, Wind Mitigation Measures and Solid Screen on Pavilion Structure.

The potential wind conditions at pedestrian level within and around the site were predicted using the results from a boundary-layer wind tunnel test combined with historical meteorological wind records for the area, graded against the Western Gateway Precinct wind comfort criteria as shown on site plans in Figures 1 through 22, while the associated wind speeds are listed in Table 1.

The results can be summarised as follows:

- The existing baseline wind conditions generally satisfy the siting and standing categories throughout the precinct, with localised areas satisfying the walking category at probe location 23 to the east of Lee Street. This location was also noted to exceed the safety threshold.



- The inclusion of the proposed Atlassian Central development on Block A would result in conditions that continue to meet the required comfort conditions with the majority of areas in the public domain being suitable for sitting to walking use.
- While not areas of the 'public domain' under the Western Gateway Sub-Precinct Design Guidelines, some on-site wind conditions would be windier than suitable for a number of amenity spaces on the podium (probe locations 105, 109 and 113). Some of these areas on and off-site would exceed the safety threshold (probe locations 52 and 109) and would thus require local mitigation to ensure the safety threshold is not exceeded. These spaces would, however, be controlled and managed by Atlassian, as opposed to the areas in the public domain.
- With the introduction of the submitted Central Place development on Block B (which has only recently come off public exhibition), wind conditions off-site along Lee Street and Henry Dean Plaza would be windier than Configuration 2, however would continue to meet the standing/walking criteria annually. On-site wind conditions would improve at podium level with the majority of areas meeting sitting and standing use conditions suitable for an outdoor area, except for probe locations 109 and 113 which would continue to be windier than suitable for the intended use and would require mitigation. The number of safety exceedances off-site would also increase from two location in Configuration 2 to six locations (23, 44, 62, 63, 72 and 76), but safety exceedances on-site would be eliminated.
- With the inclusion of the reference scheme on Block C (which is subject to change given its early stage of planning), in combination with the proposed development and Block B, wind conditions would further increase between the developments. This is due to the wind flow channelling between the massing forms causing walking wind conditions at probe locations 8-10 and 90 at ground level. On-site wind conditions would remain similar to Configuration 3, with probe locations 109 and 113 one category windier than suitable for the intended use. Ground level safety exceedances would reduce from six in Configuration 3 to five (at probe locations 9, 12, 23, 62 and 72), with no safety exceedances on-site.
- The wind assessment was conducted with landscaping and the wind mitigation strategy for Atlassian Central (Block A) only. Therefore, additional mitigation measures would be required as suggested in the mitigation section of this report to resolve the comfort exceedances on-site in the context of existing surrounds. The effectiveness of these mitigation measures would need to be tested and reviewed by an experienced wind engineer to ensure that wind conditions would improve to be suitable and safe for the intended use.

Overall, the wind microclimate around the proposed development Atlassian Central would improve with the incorporation of the wind mitigation strategy. Conditions were noted to generally improve as the adjacent blocks of the Western Gateway Precinct are developed based on the current proposed massing due to the additional shielding created from a tower cluster. Noting the current conditions are able to be achieved for the Atlassian Central development with a suitable mitigation strategy, it will be important for the adjacent Central Place and Toga Central developments to consider these measures and develop this strategy accordingly for a beneficial wind comfort outcome for the precinct.



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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed development known as the Atlassian Central development located on Block A of the Central Station Western Gateway Precinct in Sydney, NSW. This report presents the project objectives, background and approach, and discusses of the results from RWDI's wind tunnel assessment and provides conceptual wind control measures, where necessary.

1.1 Project Description

The project (site shown in Image 1) is located at the north-western corner of the Central Station Western Precinct at the south-eastern side of the Upper Carriage Lane just of Lee Street. Block B (Central Place) located to the south and Block C (TOGA Central) is located to the north-west of the site. The proposed development will replace the existing building and is approximately 126 m in height.

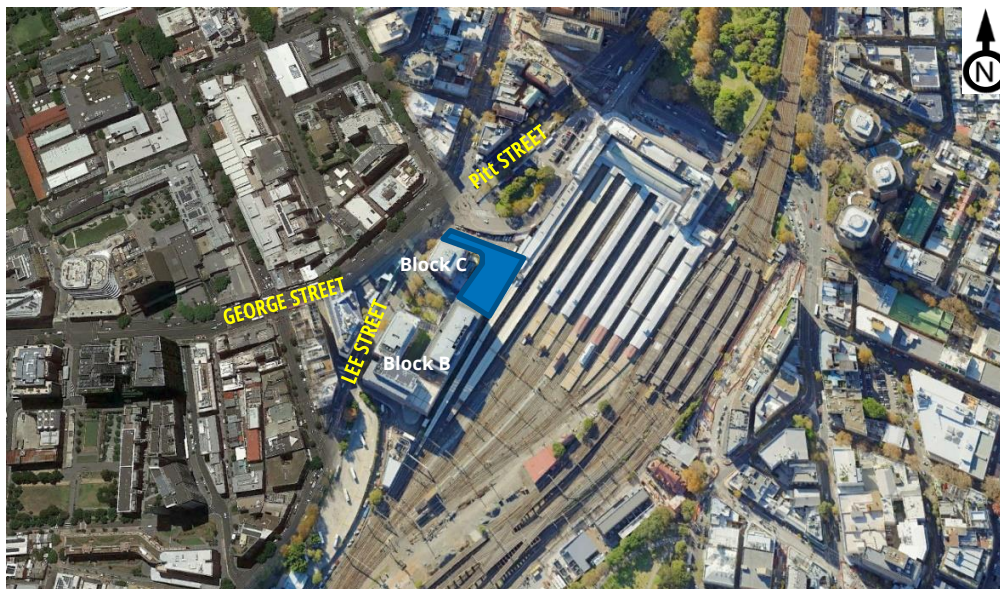


Image 1: Aerial View of site (approximate extent of the site highlighted in blue) and Surrounding Environment (Photo Courtesy of Google™ Earth)

1.2 Objectives

The objective of the study was to assess the effect of the proposed development on local conditions in pedestrian areas within and around the study site and provide recommendations to minimise adverse effects, if needed. This quantitative assessment was based on wind speed measurements of a scale model of the proposed development and surrounding buildings in one of RWDI's boundary-layer wind tunnels. These measurements were combined with the local wind records and compared to appropriate criteria to gauge the level of wind comfort and safety in pedestrian areas. The assessment focused on critical pedestrian areas, including public footpaths.

2 BACKGROUND AND APPROACH

2.1 Wind Tunnel Study Model

To assess the wind environment around the proposed development, a 1:300 scale model of the development site and surroundings was constructed for wind tunnel testing of the following configurations:

- | | |
|--------------------------|---|
| Configuration 1: | Existing Site with Existing Surrounding Buildings; |
| Configuration 2: | Atlassian Central with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures; |
| Configuration 3: | Atlassian Central and Central Place with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures; |
| Configuration 4: | Atlassian Central, Central Place and Toga Central (Reference Scheme) with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures; |
| Configuration 4A: | Atlassian Central, Central Place and Toga Central (Reference Scheme) with Existing Surrounding Buildings, Local Landscaping, Wind Mitigation Measures and Angled Pavilion Structure; and |
| Configuration 4B: | Atlassian Central, Central Place and Toga Central (Reference Scheme) with Existing Surrounding Buildings, Local Landscaping, Wind Mitigation Measures and Solid Balustrade on Pavilion Structure. |

Configurations 1 to 4 are shown in Images 2 through 5.

The wind tunnel model included all relevant surrounding buildings and topography within an approximately 360 m radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 136 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 1.5 m above local grade in the pedestrian accessible areas throughout the study area. Wind speeds were measured for 36 directions at 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. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site and reviewed by the client.

A publicly accessible privately owned space is proposed above the Parcels Shed Roof. This is referred to as the "OSD Podium". This is noted to provide an additional open space element within the Site, and also provides an opportunity to pedestrian linkages to future over rail development to the east of the site. The OSD Podium comprises a mix of landscaping, tiered seating and an enclosed pavilion on the eastern portion of the Parcels Shed roof.

The five topmost levels of the building for the Tower Crown which combine a mix of enclosed and open-air space, aligned with the sun access plane. These levels will accommodate a mix of amenities including health and wellness, café and dining, meeting and lounge spaces as well as planted 'Roof Terraces'.



Image 2: View from the south of the Existing Site with Existing Surrounding Buildings in the wind tunnel



Image 3: View from the south of the Atlassian Central Development with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures in the wind tunnel

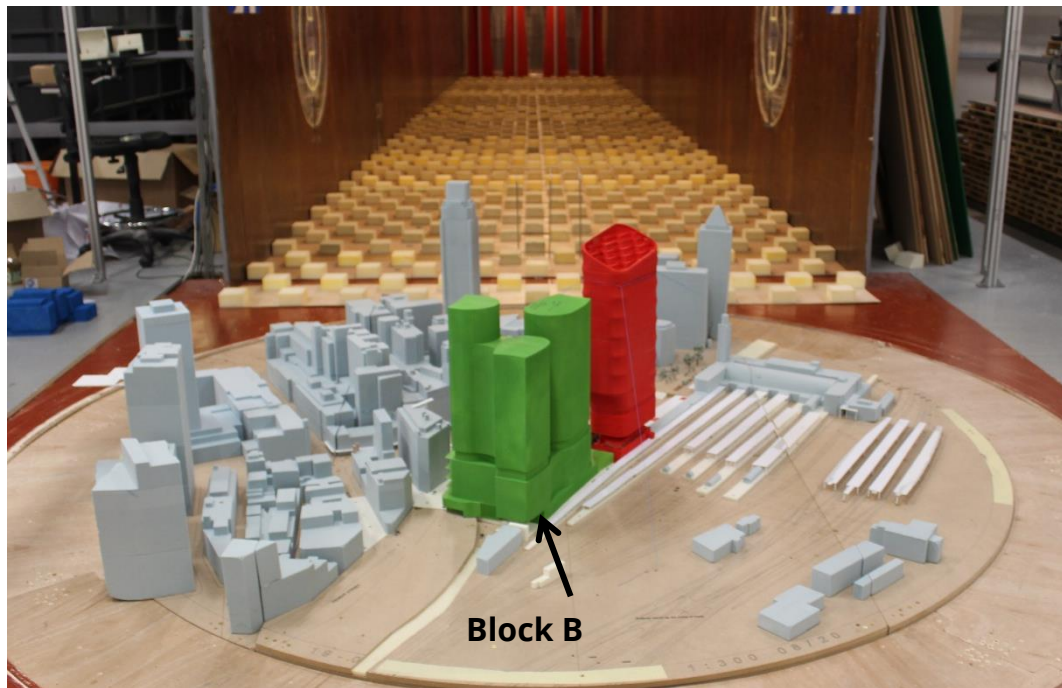


Image 4: View from the south of the Atlassian Central and Central Place Developments with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures in the wind tunnel

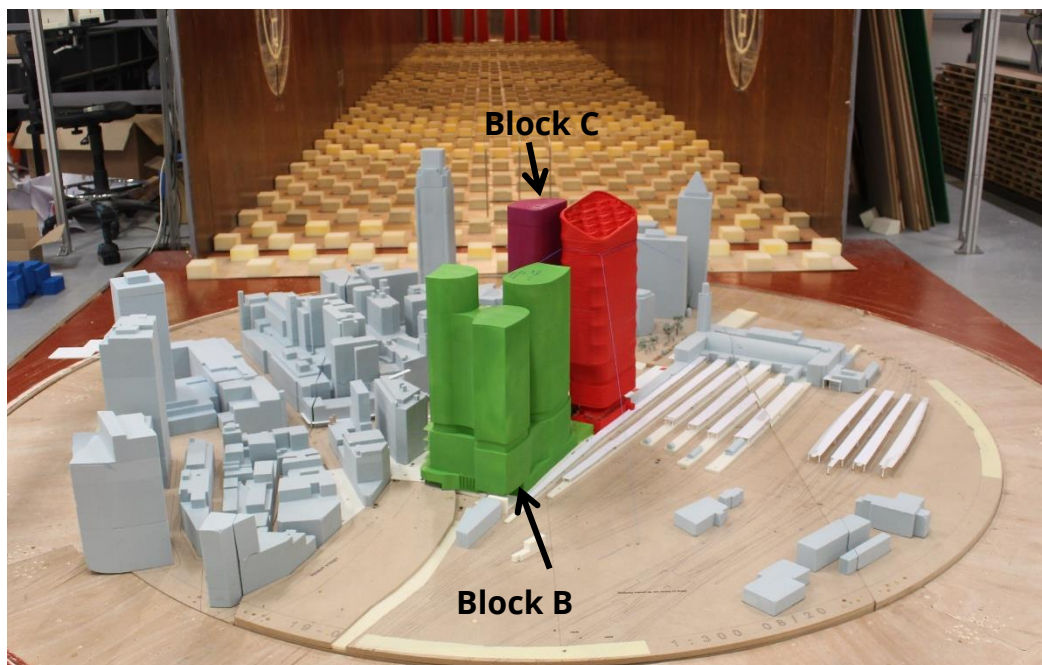


Image 5: View from the south of the Atlassian Central, Central Place and Toga Central Developments with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures in the wind tunnel

2.2 Meteorological Data

Wind statistics recorded at Sydney International Airport between 1995 and 2018, inclusive, were analysed for the Summer (November to April) and Winter (May to October) seasons. Image 6 graphically depicts the directional distributions of wind frequencies and speeds for these two seasons. Winds from the north-northeast, south-southeast are predominant during Summer season while winter winds tend to originate from the northwest quadrant, west-southwest and south-southwest as indicated by the wind roses. Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10 m) occur for 10.6 % and 8 % of the time during the summer and winter seasons, respectively.

Wind statistics were combined with the wind tunnel data to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared with the wind criteria for pedestrian comfort and safety.

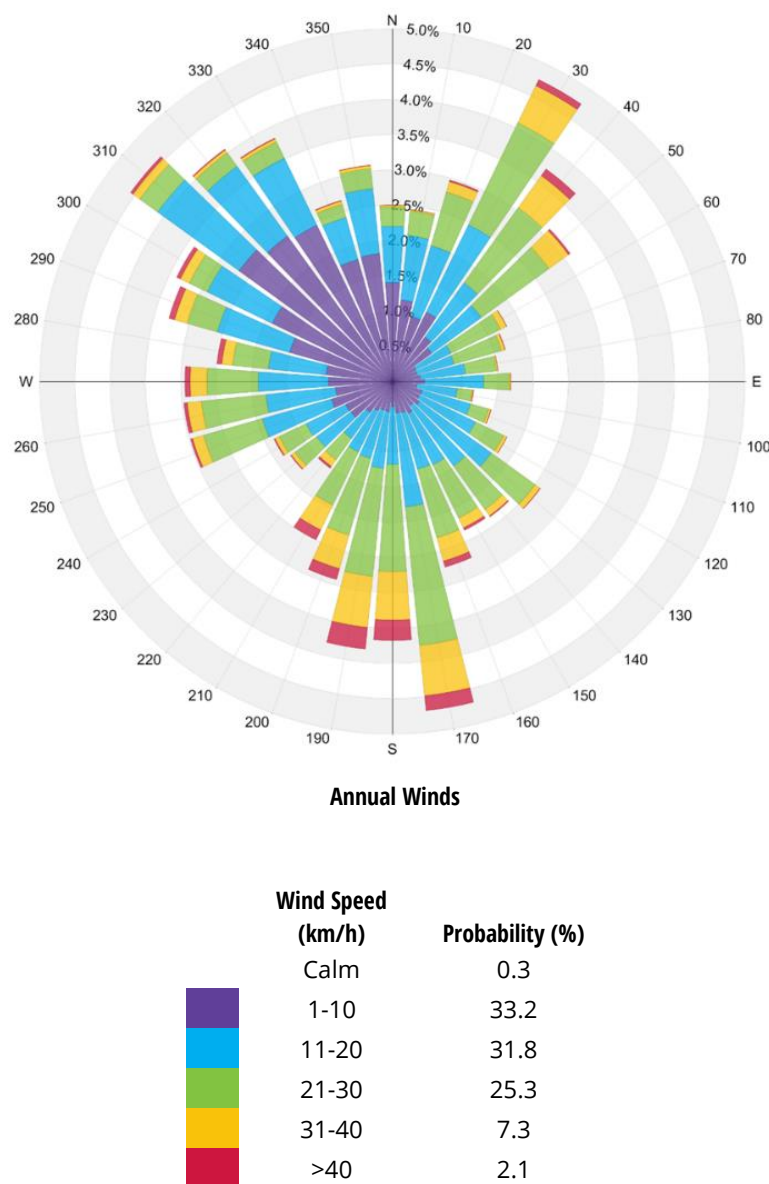


Image 6: Directional Distribution of Winds Approaching Sydney International Airport From 1995 to 2018

2.3 The Draft Sydney Planning Strategy 2016-2036 wind criteria

The assessment of wind comfort and safety is based on the criteria described in the Draft Sydney Planning Strategy 2016 – 2036. The criteria states the following:

*Define the mandatory **Wind Safety Standard** as an annual maximum peak 0.5 second gust wind speed in one hour measured between 6am and 10pm Eastern Standard Time (EST) of **24 metres per second**.*

*Define the mandatory **Wind Comfort Standard for Walking** as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST (i.e., 5 percent of those hours) of **8 metres per second**.*

*Define the mandatory **Wind Comfort Standard for Sitting** in Parks as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST of **4 metres per second** and applies to parks protected by Sun Access Planes and/or No Additional Overshadowing Controls.*

*Define the desirable **Wind Comfort Standard for Sitting and Standing** as an hourly mean wind speed, or gust equivalent mean wind speed, whichever is greater for each wind direction, for no more than 292 hours per annum measured between 6am and 10pm EST of:*

4 metres per second for Sitting

6 metres per second for Standing

2.4 Western Gateway Wind Comfort Criteria

A Wind Comfort Criteria Map has been developed for the Western Gateway precinct and is noted in Image 7 below. While the Western Gateway Design Guidelines are yet to be endorsed, the proposed Wind Comfort Criteria Map outlined in this document has been used as the basis of this report. The wind criteria notes the following key aspects

- Wind impacts from any development must not exceed the Wind Safety Standard which is an annual maximum peak 0.5 second gust wind speed in 1 hour of 24 m/s.
- Wind impacts from any development on public domain should not exceed the Wind Comfort Standard criteria for sitting, standing and walking taking into consideration the intended use of the space. The wind comfort standard is an hourly mean wind speed or gust equivalent mean wind speed, whichever is greater, for each wind direction of no more than 5% of all hours in the year. These standards are:
 - walking through the OSD connection and footpaths - 8 m/s
 - standing at building entrances, bus stops - 6 m/s
 - sitting in future public spaces - 4 m/s
- New development within the Western Gateway Sub Precinct should achieve the proposed wind comfort criteria on land outside the sub-precinct (i.e. the area outside the redline boundary on the Wind Criteria Map), unless it can be demonstrated that existing wind conditions in that area do not currently achieve the identified wind comfort criteria.

- Development subject to a quantitative wind effects report must not cause a wind speed that exceeds the Wind Safety Standard, the Wind Comfort Standard for Walking and the Wind Comfort Standard for Sitting in Parks except unless it can be demonstrated that the existing wind speeds in those locations exceed the standard.
- A minimum of 200sqm of contiguous space that is open to the sky within the defined Railway Square area is to achieve the Wind Comfort Standard criterion for sitting, and may be achieved with the assistance of well-considered and well-designed localised wind mitigation measures.

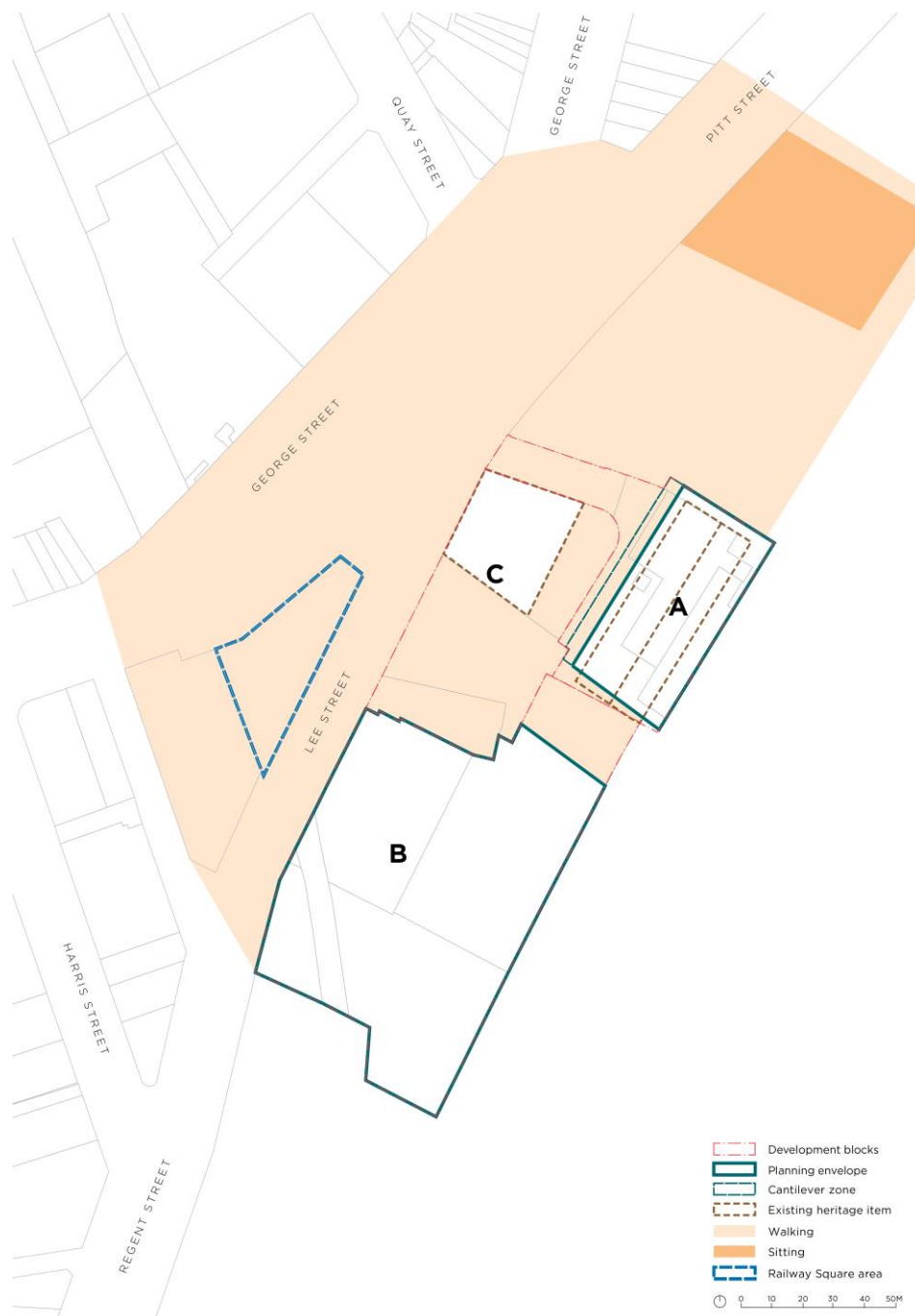


Image 7: Draft Wind Comfort Criteria Map for the Western Gateway Precinct
(NB: This is yet to be endorsed)

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on site plans in Figures 1-14 located in the “Figures” section of this report.

- Existing conditions are shown in Figures 1 and 2;
- Conditions with Atlassian Central are shown in Figures 3-6;
- Conditions with Atlassian Central and Central Place are shown in Figures 7-10; and,
- Conditions with Atlassian Central, Central Place and Toga Central are shown in Figures 11-14.

The figures are split into annual comfort conditions and safety conditions.

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.

3.1 Configuration 1: Existing Site with Existing Surrounding Buildings

3.1.1 Pedestrian Comfort (Figure 1)

The majority of wind conditions within and around the project site range from suitable for sitting to standing use throughout the year. Two probe locations (23 and 64) at the south-western corner of Block B (adjacent to the intersection of Lee Street and Little Regent Street) are noted to have walking use wind conditions, suitable for the intended use. Wind conditions around the site are generally driven by the north-north-easterly and southerly winds, as such conditions are windier during the summer months of the year when these wind directions are more prevalent.

3.1.2 Strong Winds (Figure 2)

There are occurrences of strong winds which exceed the 24 m/s criterion for more than one-hour per year at probe locations 23 and 64. These areas are modelled devoid of landscaping and thus are exposed to the prevailing wind direction in the baseline scenario.

3.2 Configuration 2: Atlassian Central with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures

3.2.1 Pedestrian Comfort (Figures 3 and 4)

3.2.1.1 *Pedestrian Footpaths*

Wind conditions along George Street (represented by probe locations 50-56, 59, 60 and 67-70) would range from suitable for sitting to walking use suitable for the intended use. Probe locations 52 and 69 would be one category windier than the baseline, however, would remain suitable for the intended use. The other probe locations would be consistent with the existing site wind conditions, representing a minimal impact with the inclusion of the proposed development for these footpath areas.

The majority of wind conditions along the eastern side of Lee Street would be suitable for standing use, apart from probe locations 18 and 23 which would be suitable for walking use. These wind conditions would satisfy the Sydney criteria for comfort along pedestrian footpaths.

The areas along the western side of Lee Street (represented by probe locations 57, 58 and 61-66) would generally satisfy the standing criteria, which includes key building entrance locations. These conditions are consistent with the existing site and hence unaffected by the inclusion of the proposed development.

3.2.1.2 Henry Dean Plaza

Wind conditions within Henry Dean Plaza (represented by probe locations 4, 7-10, 31, 32 and 34) would be suitable for sitting or standing throughout the year, with similar conditions to the baseline scenario.

3.2.1.3 Western Forecourt

Wind conditions within the proposed Western Forecourt precinct (Locations 35-49 and 83) to the north of the Western Gateway Precinct would be one category windier at probe locations 37, 38, 41, 44-47, 49 and 83 than the baseline scenario, however, these locations would remain satisfactory for standing use.

3.2.1.4 Central Station

Wind conditions at Central Station (locations 72-81) would generally be suitable for standing use annually.

3.2.1.5 OSD Podium and Ground Level Amenity

Ground level amenity spaces to the north-west of the proposed development would have wind conditions suitable for sitting to standing use at probe locations 15, 95-104, 106 and 115-117. If designated seating areas are intended at locations suitable for standing use additional mitigation measures would be required to provide adequate shelter.

OSD podium level amenity spaces (represented by probe locations 13, 14, 16, 93, 94, 105, 107-114, 134 and 135) would generally be suitable for standing use annually and probe locations 105 and 113 suitable for walking use. Uncomfortable wind conditions would occur at probe location 109. The uncomfortable and walking use wind conditions would occur directly at the building corners which are symptoms of wind flows being accelerated due to the sharpness of the corner and the tower form above as noted during wind flow modelling for the southerly winds. These conditions would require mitigation as discussed qualitatively in Section 4.

3.2.1.6 Roof Terrace Amenity

All of the roof terrace would satisfy the sitting and standing use criteria, suitable for the intended outdoor use with the inclusion of balustrades screening. Increasing the height of the roof terrace screening to 2 metres, and setting the location back from the terrace edge to remain below the sun access plane, will be beneficial in enabling the majority of these areas to satisfy the sitting criteria.

3.2.2 Strong Winds (Figures 5 and 6)

There are occurrences of strong winds which exceed the 24 m/s criterion for more than one-hour per year at probe locations 52 and 109. These areas are noted to only slightly exceed the safety criteria and are expected to



be able to be mitigated as the design develops. It was also found that the safety criteria for these locations will be satisfied when the future precinct built form is considered.

3.3 Configuration 3: Atlassian Central and Central Place with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures

With the introduction of the proposed development Central Place at Block B, wind conditions off-site along Lee Street and Henry Dean Plaza would be windier than Configuration 2, largely due to the southerly winds. The increase in windiness is due to the large cluster of building massing which drives the high-speed winds at height (that are undistributed) to ground level and become channelled between the surrounding built environment and at exposed corners. It is acknowledged that the massing tested for Central Place includes preliminary design solutions for the pavilion and attractor structures. As such, RWDI have tested alternative scenarios for the Pavilion Structure and understand that the Central Place proponent will continue to develop a design outcome that addresses the local wind conditions.

3.3.1 Pedestrian Comfort (Figures 7 and 8)

3.3.1.1 *Pedestrian Footpaths*

Wind conditions for all surrounding pedestrian footpaths are noted to meet the required walking criteria. Conditions along George Street (represented by probe locations 50-56, 59, 60 and 67-70) would have standing use wind conditions, suitable for the intended use. These conditions would be similar to the existing site wind conditions.

The majority of wind conditions along the eastern side of Lee Street would be suitable for standing use, apart from probe locations 23 which would be suitable for walking use. These wind conditions would satisfy the criteria for pedestrian comfort along these areas.

The areas along the western side of Lee Street represented by probe locations 57, 58 and 61 would satisfy the standing criteria, with walking conditions noted at probe locations 62-65. These conditions would be windier than Configuration 1 and hence noted to be a result of the development at Central Place causing flow channelling along the western side of Lee Street.

3.3.1.2 *Henry Dean Plaza*

Wind conditions within Henry Dean Plaza (represented by probe locations 4, 7-10, 31, 32 and 34) would be suitable for standing throughout the year, one category windier than the baseline scenario. Conditions in this area is expected to be further improved as the pavilion and attractor structures associated with the Central Place precinct are refined.

3.3.1.3 *Western Forecourt*

Wind conditions within the proposed Western Forecourt precinct (probe locations 35-49 and 83) to the north of the Western Gateway Precinct would be one category windier at probe locations 38, 41, 44-47, 49 and 83 than the baseline scenario, however, these locations would remain appropriate for the intended use.

3.3.1.4 Pavilion

Wind conditions at the Pavilion represented by probe locations 28-30 and 71 would have wind conditions suitable for sitting to standing use annually, suitable for a mixed-use amenity space.

3.3.1.5 Central Station

Wind conditions at the Central Station (represented by probe locations 72-81) would generally be suitable for standing use annually.

3.3.1.6 OSD Podium and Ground Level Amenity

Ground level amenity spaces to the north-west of the Proposed development would have wind conditions suitable for sitting to standing use at probe locations 15, 95-104, 106 and 115-117. If designated seating areas are intended at locations suitable for standing use additional mitigation measures would be required to provide adequate shelter.

OSD podium level amenity spaces (represented by probe locations 13, 14, 16, 93, 94, 105, 107-114, 134 and 135) would generally be suitable for standing use annually and probe locations 109 and 113 suitable for walking use. Walking use wind conditions would occur directly at the building corners which are symptoms of wind flows being accelerated due to the sharpness of the corner, these conditions would require mitigation as discussed qualitatively in Sections 4.

3.3.1.7 Roof Terrace Amenity

All of the roof terrace would satisfy the sitting and standing use criteria, suitable for the intended outdoor use with the inclusion of balustrades screening. Increasing the height of the roof terrace screening to 2 metres, and setting the location back from the terrace edge to remain below the sun access plane, will be beneficial in enabling the majority of these areas to satisfy the sitting criteria.

3.3.2 Strong Winds (Figures 9 and 10)

There are occurrences of strong winds which exceed the 24 m/s criterion for more than one-hour per year at probe locations 23, 44, 62, 63, 72 and 76. These areas would be a safety concern to pedestrians and would require mitigation. Noting the influence of the Central Place development on these conditions, the mitigation strategy is expected to be developed something that is developed by that site as the design is developed. This is outside of the current control of the Atlassian Central development.

3.4 Configuration 4: Atlassian Central, Central Place and Reference for Toga Central with Existing Surrounding Buildings, Local Landscaping and Wind Mitigation Measures

Similarly, with the introduction of the proposed development at Block C wind conditions off-site along Lee Street and Henry Dean Plaza would be windier than Configuration 3 as the wind funnelling effect is further exacerbated due to the increased building massing surrounding the area. However, safety exceedances on site would reduce with the introduction of the combined effects of both the proposed Central Place and Toga Central developments, which would be the precinct conditions.

3.4.1 Pedestrian Comfort (Figures 11 and 12)

3.4.1.1 *Pedestrian Footpaths*

Wind conditions along George Street (represented by probe locations 50-56, 59, 60 and 67-70) would have standing use wind conditions, suitable for the intended use.

The majority of wind conditions along the eastern side of Lee Street would be suitable for standing use, apart from probe locations 18 and 23 which would be suitable for walking use. These wind conditions would satisfy the Sydney criteria for pedestrian comfort along pedestrian footpaths.

The areas along the western side of Lee Street represented by probe locations 57, 58 and 61 would satisfy the standing criteria, with walking conditions noted at probe locations 62-65. These conditions would be windier than Configuration 1 and consistent with Configuration 3.

3.4.1.2 *Henry Dean Plaza*

The majority of wind conditions within Henry Dean Plaza (represented by probe locations 4, 7-10, 31, 32 and 34) would satisfy standing conditions or calmer throughout the year. The exception to this is probe locations 8-10 which would have walking wind conditions annually and would require mitigation. This is noted to be due to the southerly winds funnelling between Atlassian Central and Central Place before interacting with the Toga Central reference massing. The development of the Toga Central scheme will likely respond to these flow patterns to improve conditions.

3.4.1.3 *Western Forecourt*

Wind conditions within the proposed Western Forecourt precinct (Locations 35-49 and 83) to the north of the Western Gateway Precinct would be one category windier at probe locations 38, 41, 44, 45, 47, 49 and 83 than the baseline scenario, however, these locations would remain satisfactory to the standing use conditions.

3.4.1.4 *Pavilion*

Wind conditions at the Pavilion represented by probe locations 28-30 and 71 would be suitable for sitting to standing use annually, suitable for a mixed-use amenity space.

3.4.1.5 *Central Station*

Wind conditions at the Central Station (represented by probe locations 72-81) would generally be suitable for standing use annually, apart from probe location 75, which would satisfy the walking use criteria.

3.4.1.6 *OSD Podium and Ground Level Amenity*

Ground level amenity spaces to the north-west of the Proposed development would have wind conditions suitable for sitting to standing use at probe locations 15, 95-104, 106 and 115-117. If designated seating areas are intended at locations suitable for standing use additional mitigation measures would be required to provide adequate shelter.

OSD podium level amenity spaces (represented by probe locations 13, 14, 16, 93, 94, 105, 107-114, 134 and 135) would generally be suitable for standing use annually and probe locations 109 and 113 suitable for walking use. The walking use wind conditions would occur directly at the building corners which are symptoms of wind flows

being accelerated due to the sharpness of the corner and tower form above, these conditions would require mitigation as discussed qualitatively in Section 4.

3.4.1.7 Roof Terrace Amenity

All of the roof terrace would satisfy the sitting and standing use criteria, suitable for the intended outdoor use with the inclusion of balustrades screening. Increasing the height of the roof terrace screening to 2 metres, and setting the location back from the terrace edge to remain below the sun access plane, will be beneficial in enabling the majority of these areas to satisfy the sitting criteria.

3.4.2 Strong Winds (Figures 13 and 14)

There are occurrences of strong winds which exceed the 24 m/s criterion for more than one-hour per year at probe locations 9, 12, 23, 62 and 72. The number of locations has reduced when considering all three forms in the Western Gateway Precinct compared to Configuration 3. These locations likely to be resolved as the Central Place design develops, primarily at the south-eastern corner and pavilion structure as discussed in Section 4.

3.5 Wind Impact of Design Changes

The design of the Atlassian Central development has noted to have been further refined from the original planning scheme with the following key external form changes noted:

- Lowering of the tower by one metre to RL 39
- Changes to the tower corner radii from 9m to 7m
- Southern Cantilever zone changes
- Western Cantilever zone changes

These design changes have been considered as part of this updated wind tunnel study and can be noted that these design changes resulted in a negligible effect on the wind environment conditions around the site.

4 MITIGATION MEASURES

This section discusses the mitigation measures recommended by RWDI to mitigate the windy conditions within and around the proposed development and compliment the proposed landscaping included on site.

In the development of the mitigation strategy discussed below and also to understand the impact of the alternative pavilion roof designs, flow visualisation modelling has been carried out for the development to better understand the flow patterns such that a suitable strategy which responds to these complex flows accordingly.

4.1 Atlassian Central Mitigation Strategy

The mitigation strategy developed during earlier testing (RWDI report #2100277 dated 3 December 2020) was modified slightly based on the updated podium and roof terrace designs, and incorporated into testing for Configurations 2, 3, 4, 4A, and 4B. The wind mitigation features introduced to the design are as follows:

- Four 30% porous vertical screens (5m in height, 3m wide), three placed perpendicular to the eastern elevation cascading on the stairs and one placed perpendicular to the northern elevation directly at the north-eastern corner;
- One 30% porous vertical screen (5m in height, 3m wide) perpendicular to the western elevation placed directly at the north-western corner;
- 13 deciduous trees 3m tall placed on the podium;
- Porous balustrade 30% open 1.5m in height around the staircase to the south-west of the podium and along the south-western, south-eastern and north-eastern perimeter of the podium;
- Dense shrubs at ground level amenity 1.5m in height with 27 deciduous trees 6m tall spaced on the shrubs.

The mitigation measures described above are shown in Image 8.

With the inclusion of the mitigation measures above for the Day 1 scenario (Atlassian Central only), wind conditions at probe locations 52, 105, 109 and 113 would continue to require mitigation measures to be suitable and safe for the intended use. It would be expected that with the inclusion of dense shrubs at least 1.5m in height beneath the trees at the podium, wind conditions would likely improve. The effectiveness of these mitigation measures would need to be tested to ensure that the comfort and safety exceedances would be resolved. It is noted that these locations will also be improved when the Central Place development is considered, as well as the Toga Central development.

Landscaping has also been modelled in their expected form and side at the time of installation and hence conditions will improve as the landscaping grows towards maturity.

The OSD level of the development is noted to be proposed as a managed space and as such can be controlled by the operator during unfavourable conditions, which would include wind-rain events due to the elevated location. As can be noted in Figure 8a, for the Sydney region wind-rain events are mainly governed by the southerly wind directions. These events will impact the accessibility to the OSD level and hence access to the space. It is also noted that the southern mitigation measures The open nature of this area and exposure to the wind-rain events supports the need for this area to be a managed space.

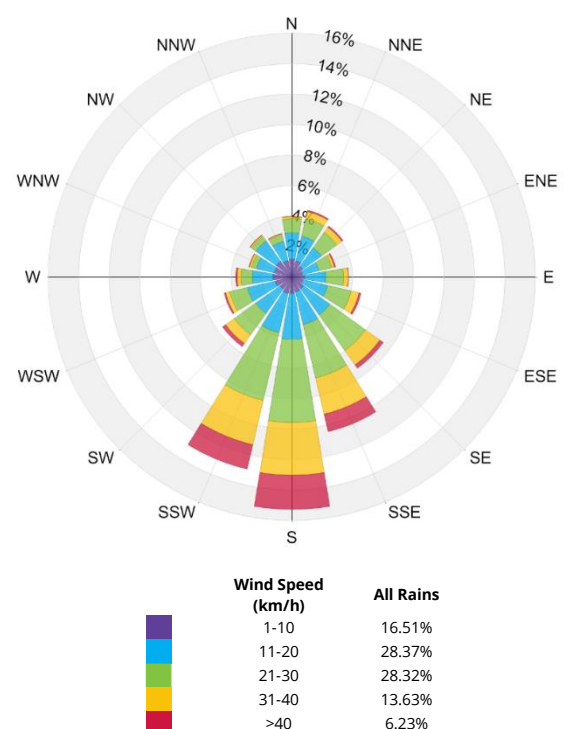


Image 8a: Wind Rain Events for Sydney



Image 9b: Deciduous trees 3m tall placed on the podium on the western, southern and eastern sides.



Image 8c: Vertical porous screens (5m in height, 3m wide), placed on the podium around the northern corners



Image 8d: Deciduous trees 6m tall with shrubs 1.5m tall placed underneath along the lower part of the podium



Image 8e: Solid balustrade as part of the latest proposed development design

4.2 Configuration 4A: Atlassian Central, Central Place and Reference for Toga Central with Existing Surrounding Buildings, Local Landscaping, Wind Mitigation Measures and Angled Pavilion Structure

Configuration 4 concluded that wind conditions would be windier than suitable and would exceed the safety threshold in several areas:

- Eastern side of Lee Street (Probe location 18 and 23);
- Western side of Lee Street (Probe locations 62-65);
- Southern corner of Block B (Probe location 26);
- Henry Dean Plaza (Probe locations 8-10)
- The last platform to the south of the central station (Probe location 72); and
- Podium level amenity spaces at the building corners (Probe locations 109 and 113).

A change in the roof of the Central Place (Block B) pavilion structure, such that there was an upward slope (5.25 m in height) from east to west (as shown in Image 9) was tested. This was found to improve wind conditions at probe locations 8 and 9 by one category in comparison to Configuration 4 as shown in Figures 15 and 16. Location 9 was also found to satisfy the safety criteria with this design change to the pavilion roof. Wind conditions at all other locations would generally remain consistent with Configuration 4. The roof feature however will further increase the safety exceedance on the station platform at location 72 due to the west-north-westerly winds.



Image 10: The angled pavilion structure used to improve conditions at Henry Dean Plaza

4.3 Configuration 4B: Atlassian Central, Central Place and Reference for Toga Central with Existing Surrounding Buildings, Local Landscaping, Wind Mitigation Measures and Solid Balustrade on Pavilion Structure

A second change to the pavilion structure incorporating a wall 8 m in height with a 4.5 m gap at the Block B podium form (as shown in Image 10) was tested. This was found to further improve the conditions at locations 8, 9 and 10 compared to the inclined pavilion roof design as shown in Figures 19 and 20, while all other conditions remain generally the same. Conditions at location 72 still exceeded the safety limit criteria, however returned to similar conditions to the flat pavilion design option.

Some minor differences in the wind conditions were noted on the Atlassian Central OSD Podium level, however are only generally minor in nature.

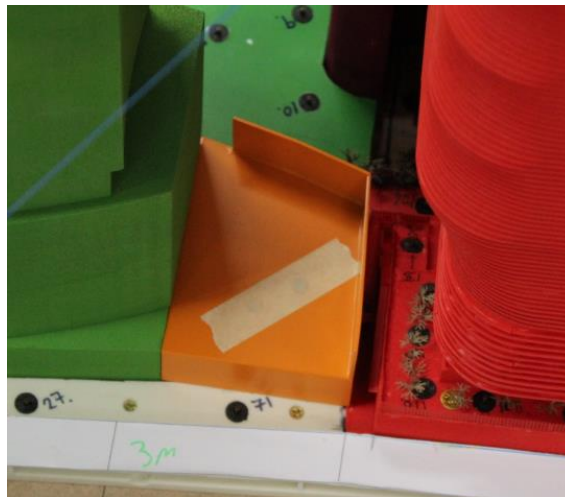


Image 11: The solid balustrade on the pavilion structure used to improve conditions at Henry Dean Plaza

4.4 Recommendations

Overall, the wind microclimate around the proposed development Atlassian Central would improve with the incorporation of the wind mitigation strategy discussed in Section 4.1. Conditions were noted to generally improve as the adjacent blocks of the Western Gateway Precinct are developed based on the current proposed massing due to the additional shielding created from a tower cluster. Noting the current conditions are able to be achieved for the Atlassian Central development with a suitable mitigation strategy, it will be important for the adjacent Central Place and Toga Central developments to consider these measures and develop this strategy accordingly for a beneficial wind comfort outcome for the precinct.



5 APPLICABILITY OF RESULTS

The drawings and information listed below were received from Avenor and were used to construct the scale model of the proposed Atlassian Central development in Sydney. The wind conditions presented in this report pertain to the proposed development as detailed in the architectural design drawings listed in the table below. The constructed scale model was reviewed and approved by Avenor prior to commencement of testing.

Should there be any design changes that deviate from this list of drawings, the wind condition predictions presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

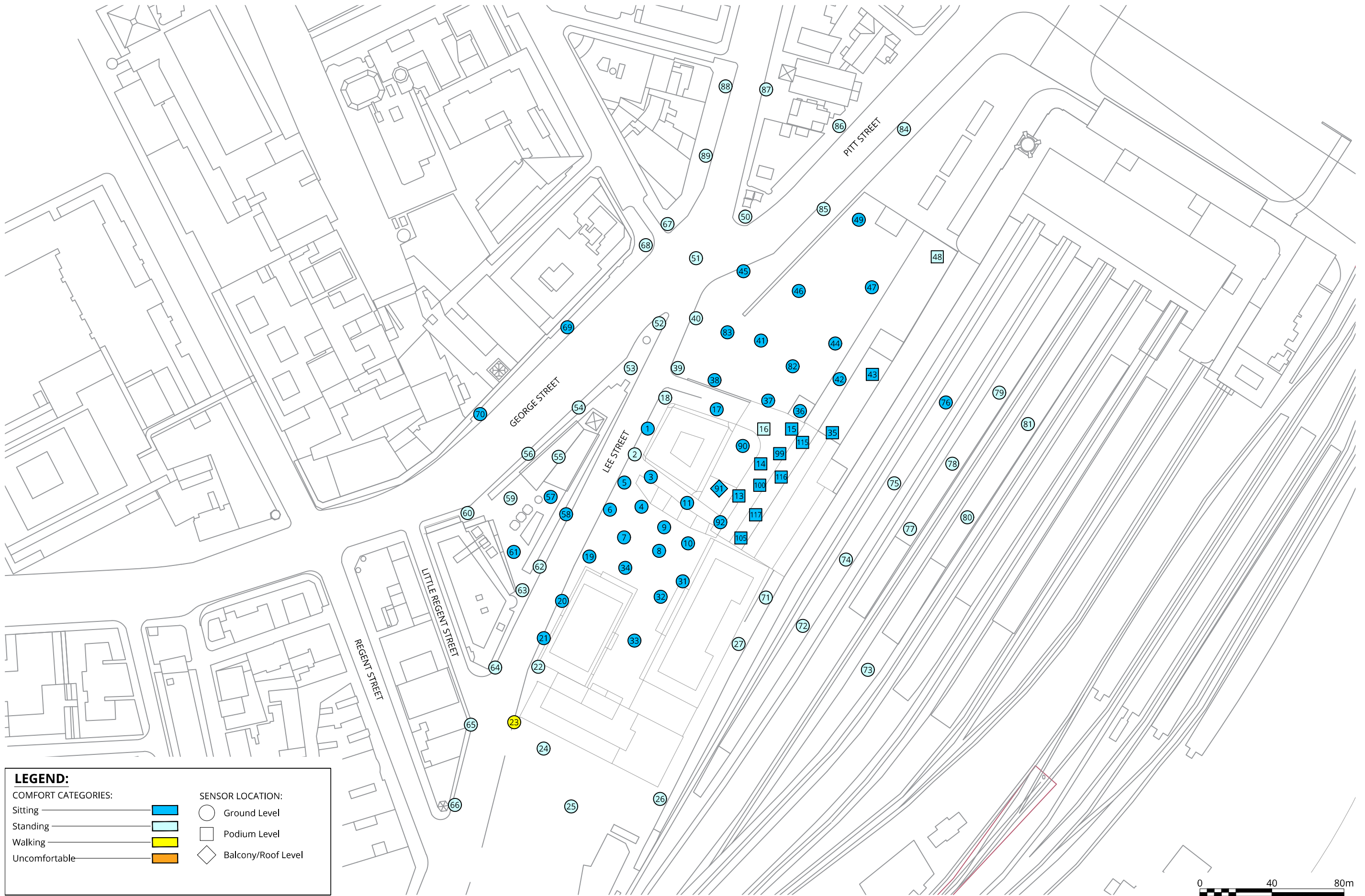
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20210223_CPS Wind Model	Rhino 3D	30/03/2021

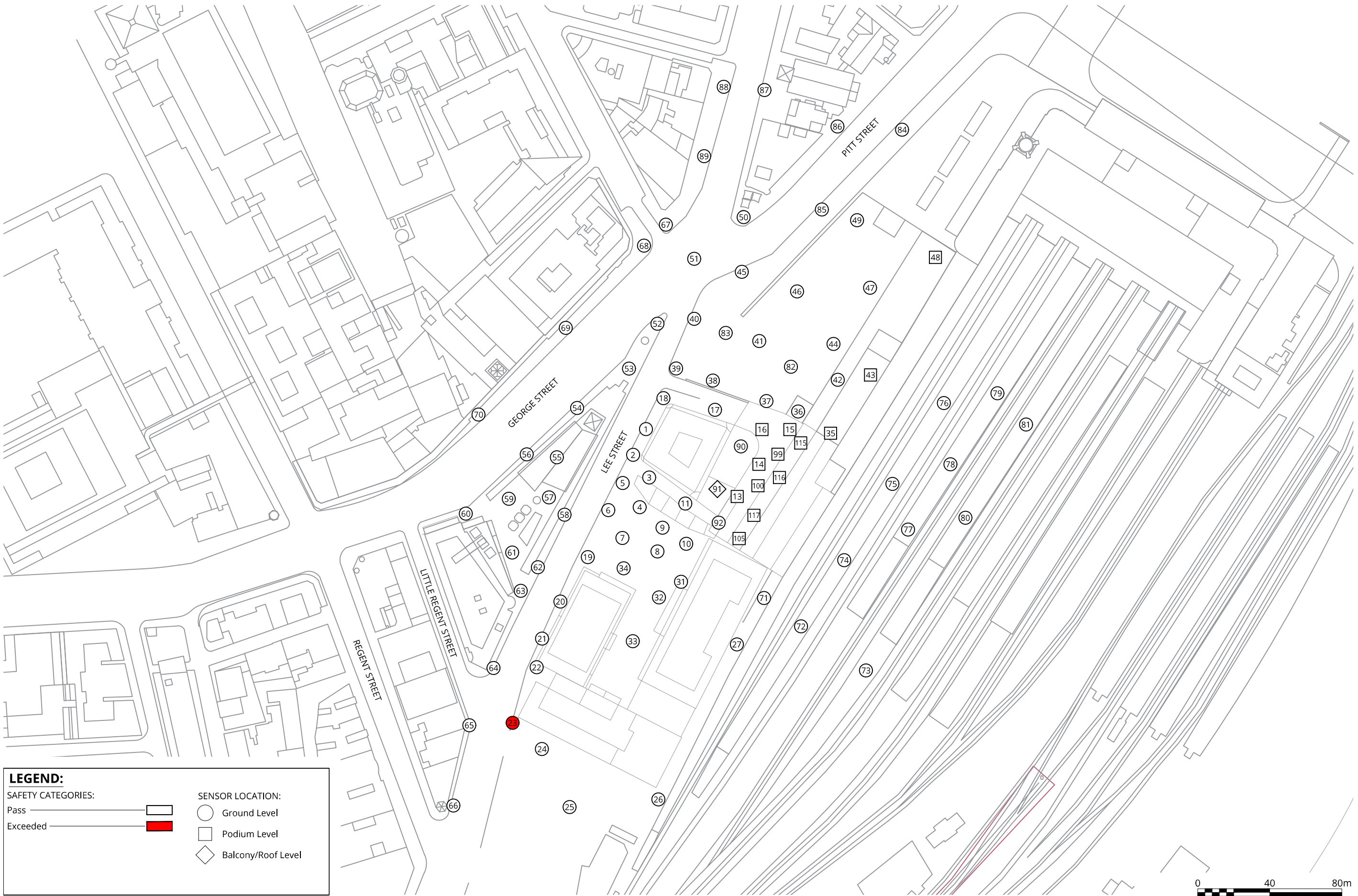
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11. Williams, C.J., Wu, H., Waechter, W.F. and Baker, H.A. (1999). "Experiences with Remedial Solutions to Control Pedestrian Wind Problems," *Tenth International Conference on Wind Engineering*, Copenhagen, Denmark.

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
FIGURES






LEGEND:

SAFETY CATEGORIES:

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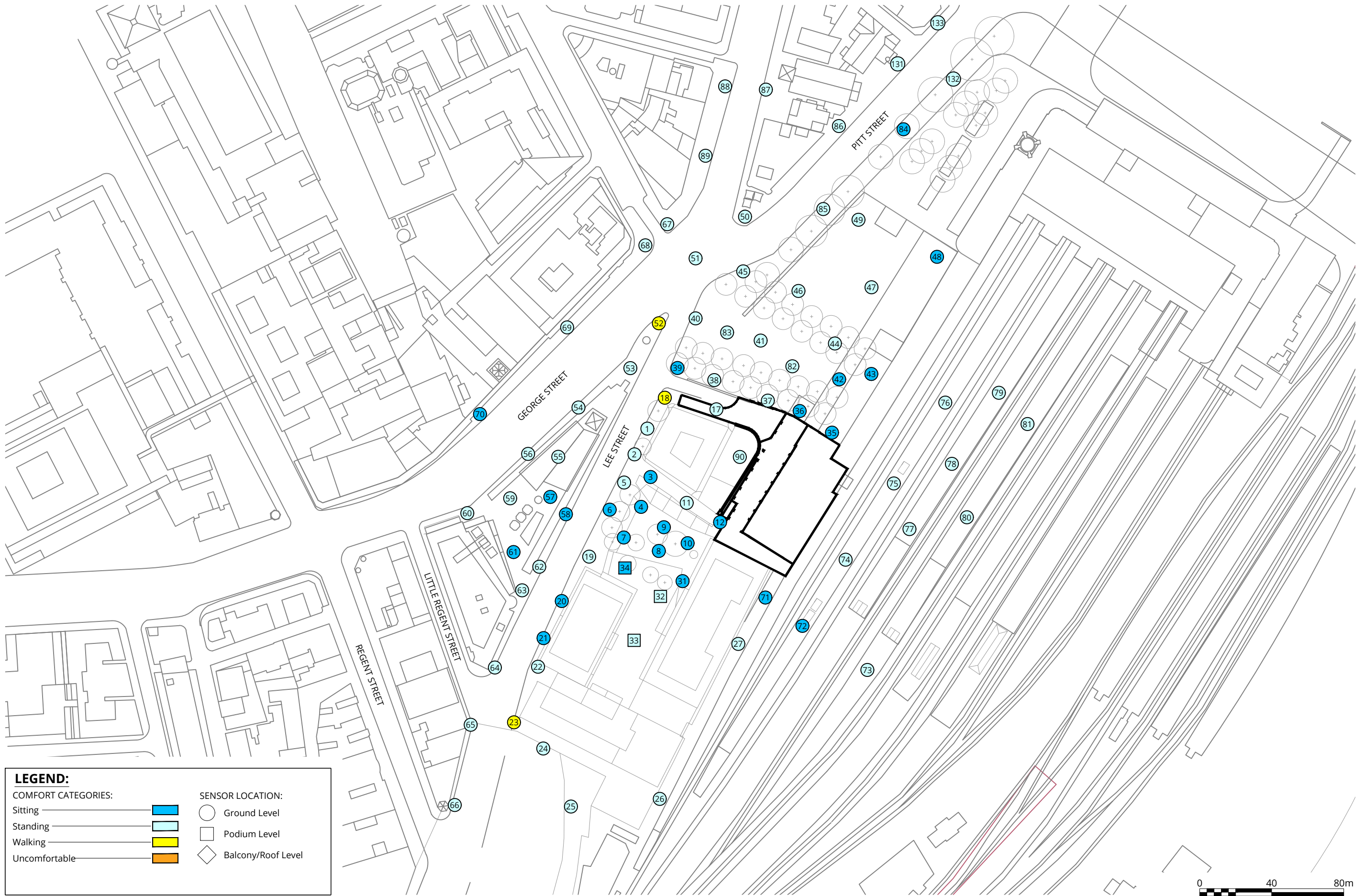
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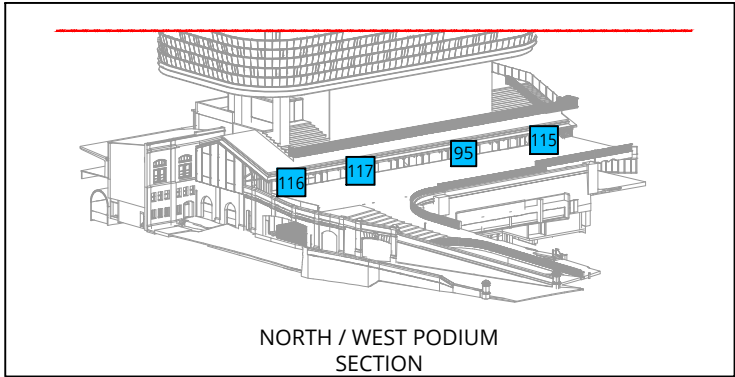
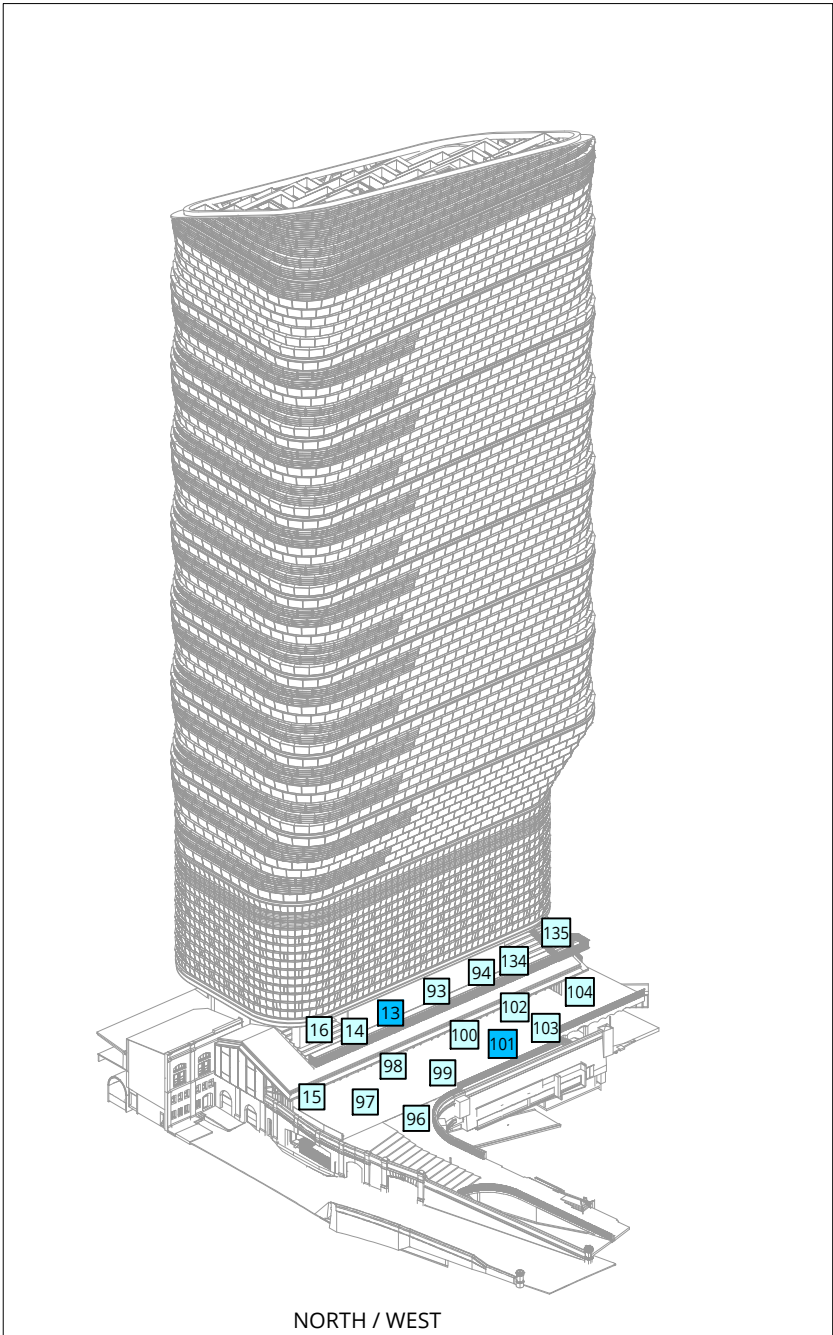
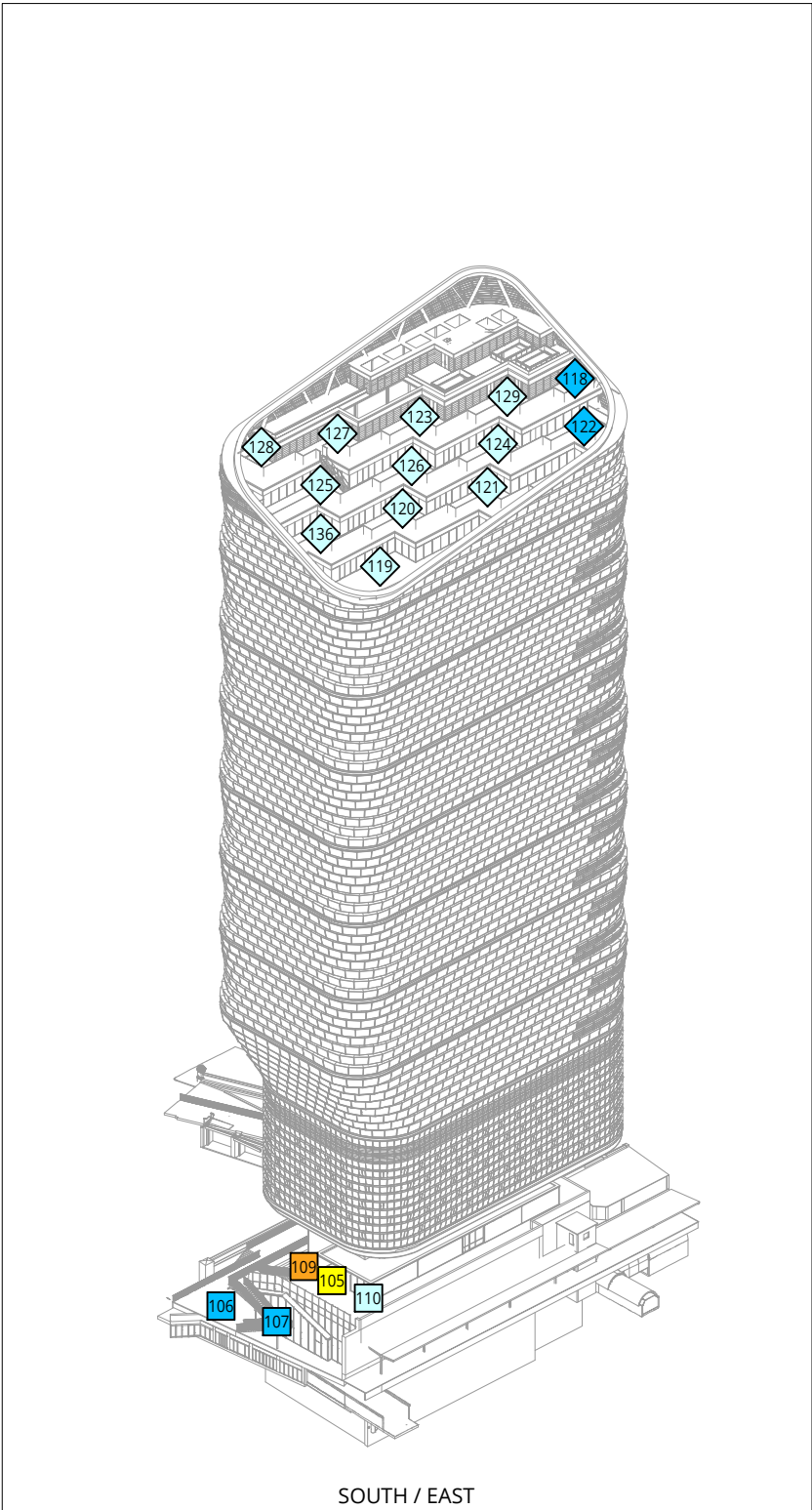
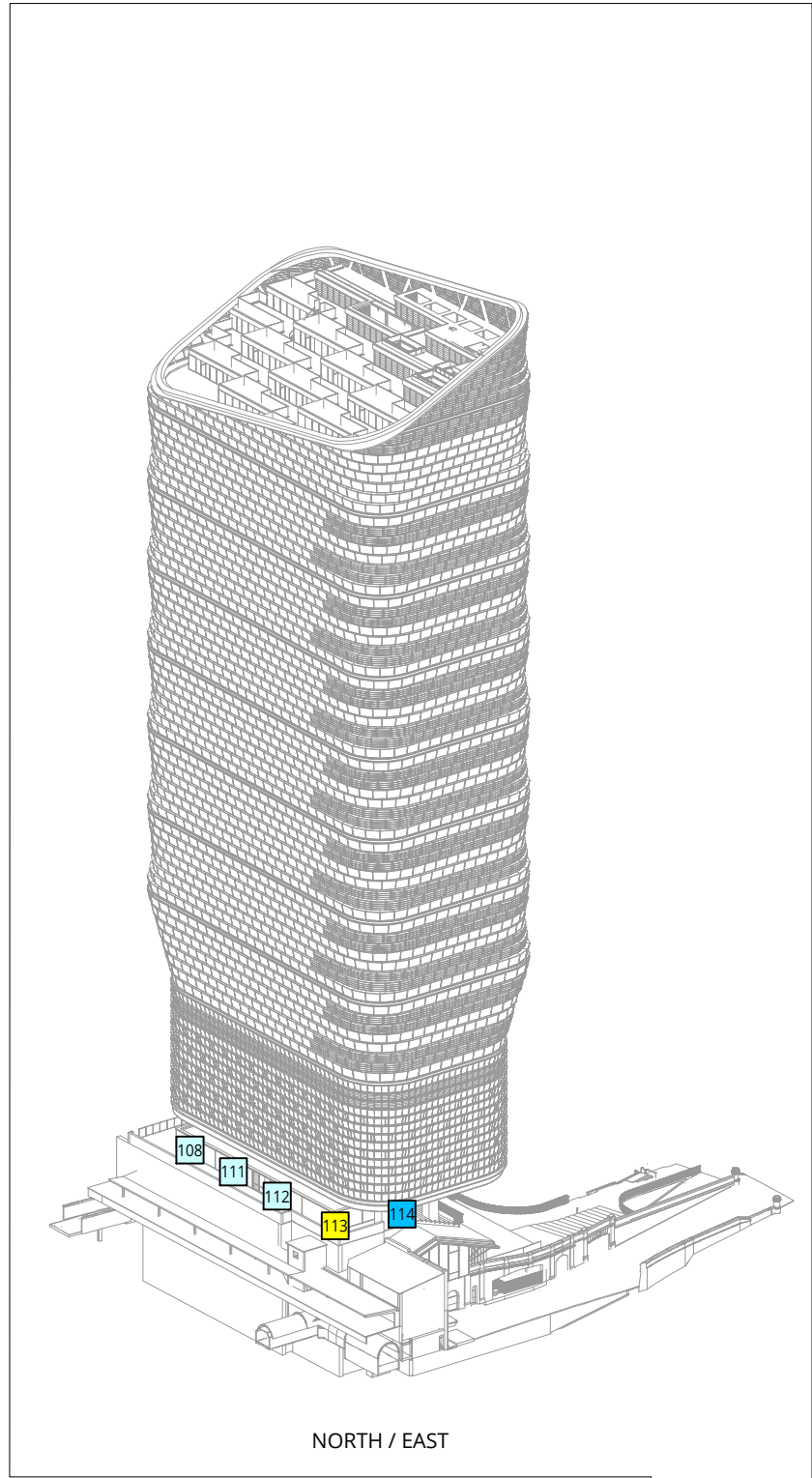
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□ Podium Level

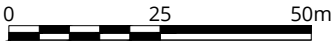
◇ Balcony/Roof Level





LEGEND:

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Standing		Podium Level
Walking		Balcony/Roof Level
Uncomfortable		



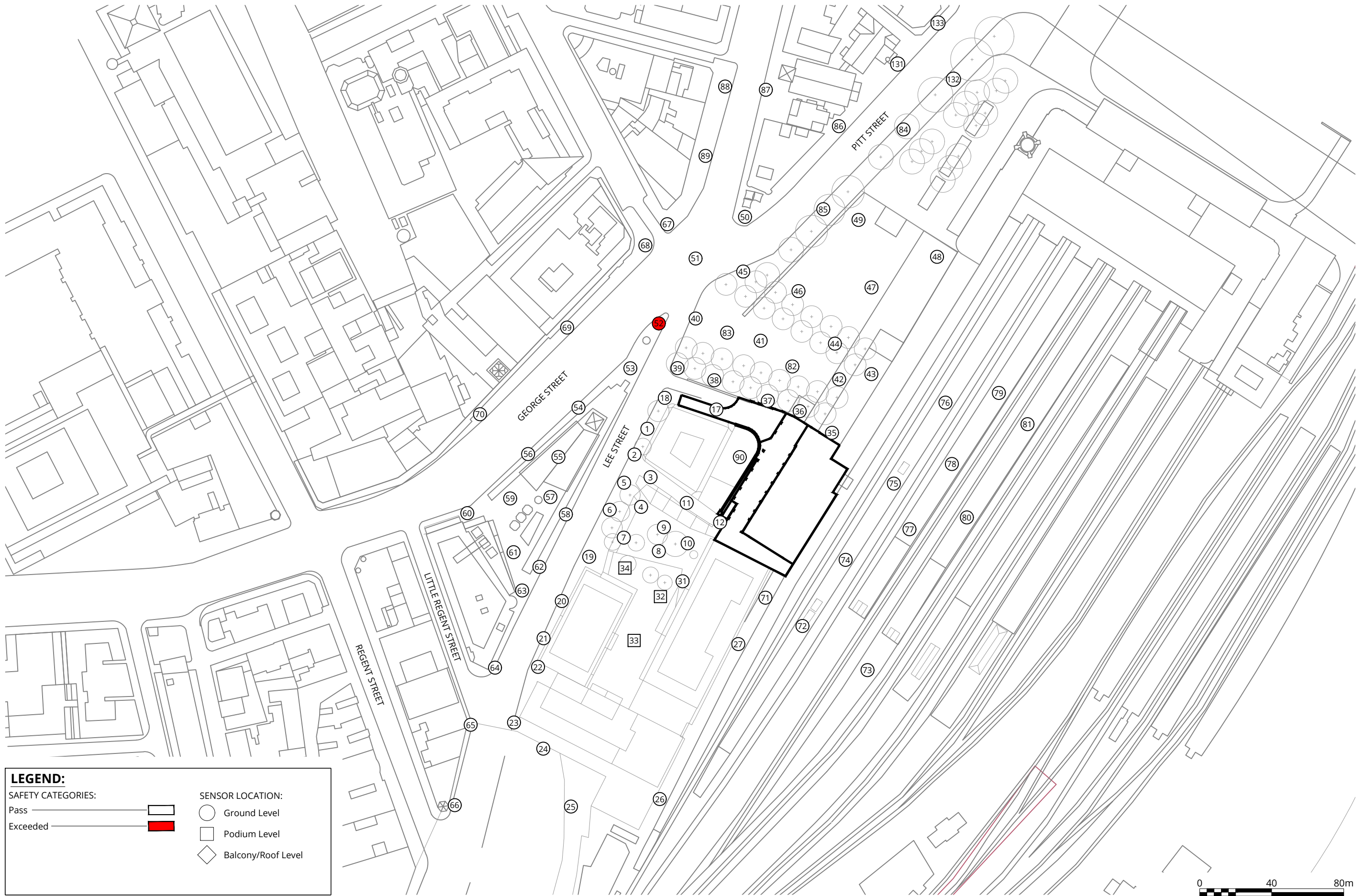
Pedestrian Wind Comfort Conditions - Elevated Levels
 Configuration 2: Proposed Block A Development with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures
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Pedestrian Wind Safety Conditions - Ground Floor
 Configuration 2: Proposed Block A Development with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures
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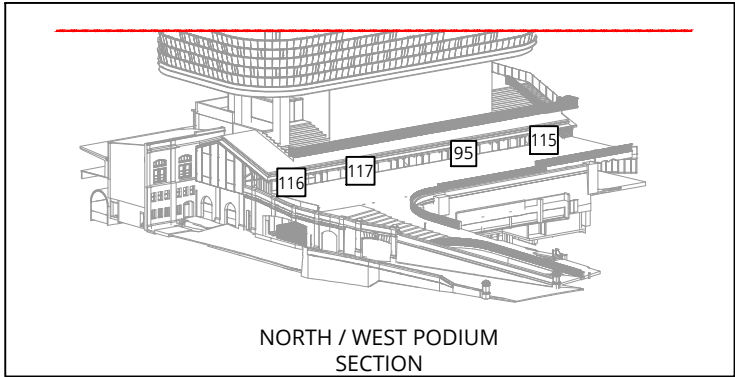
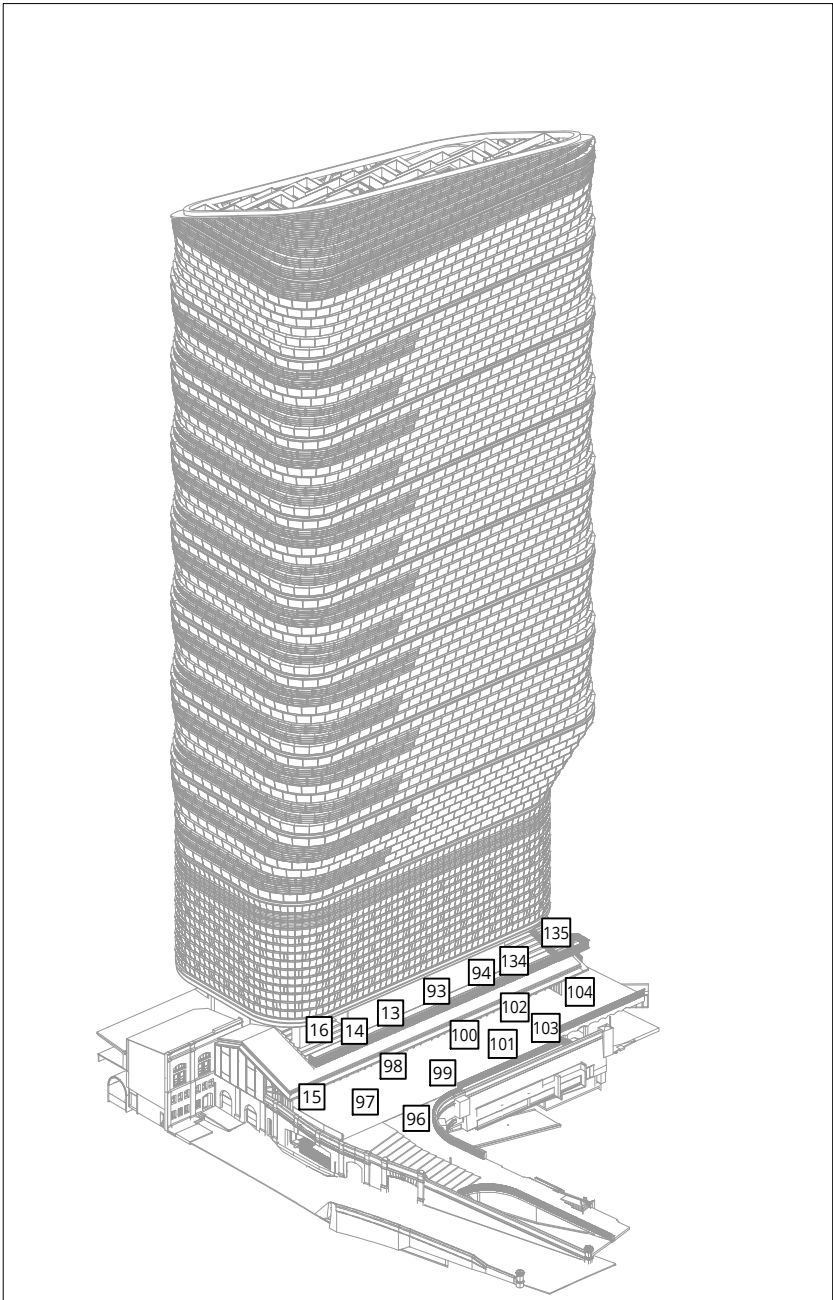
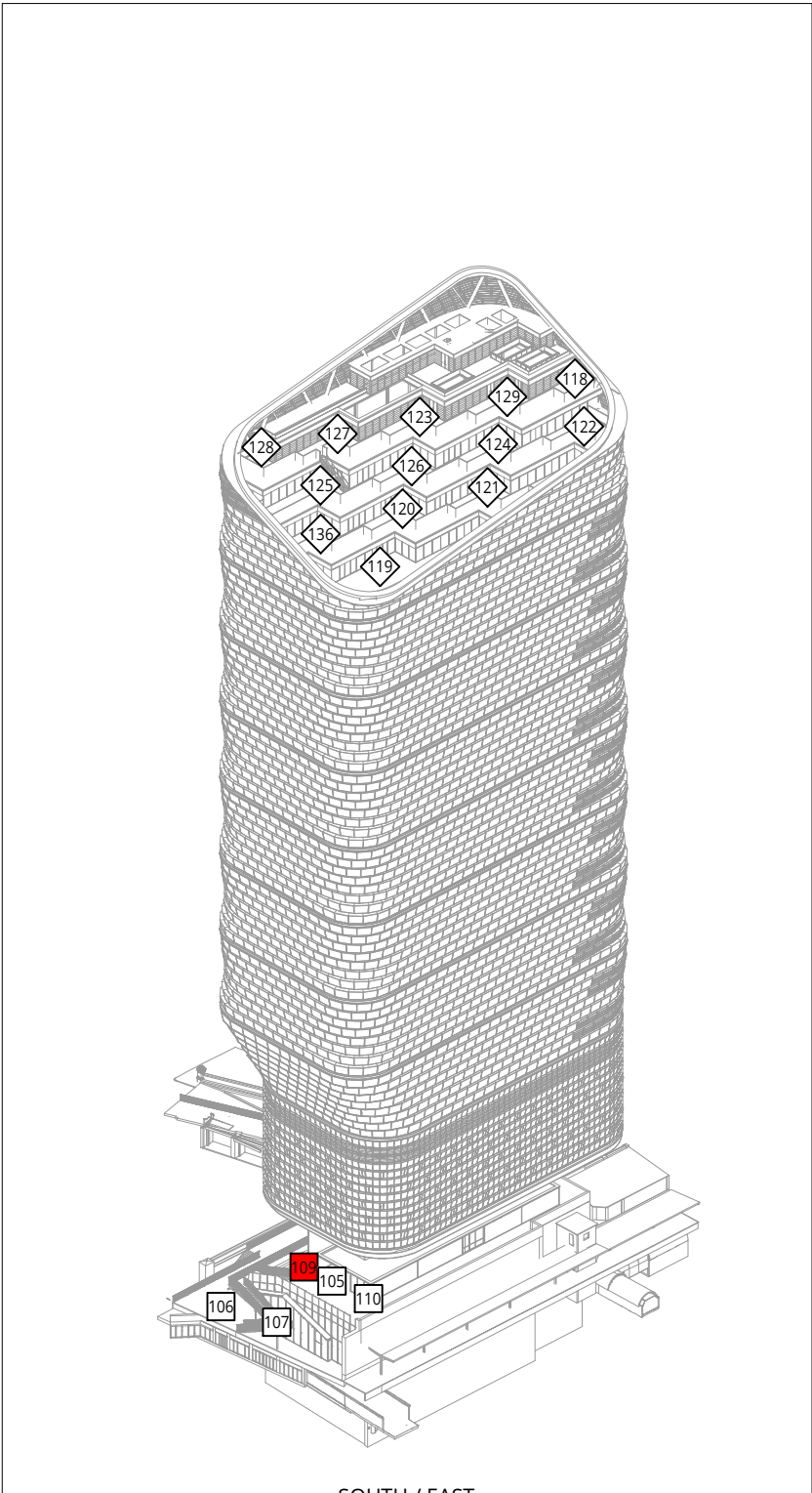
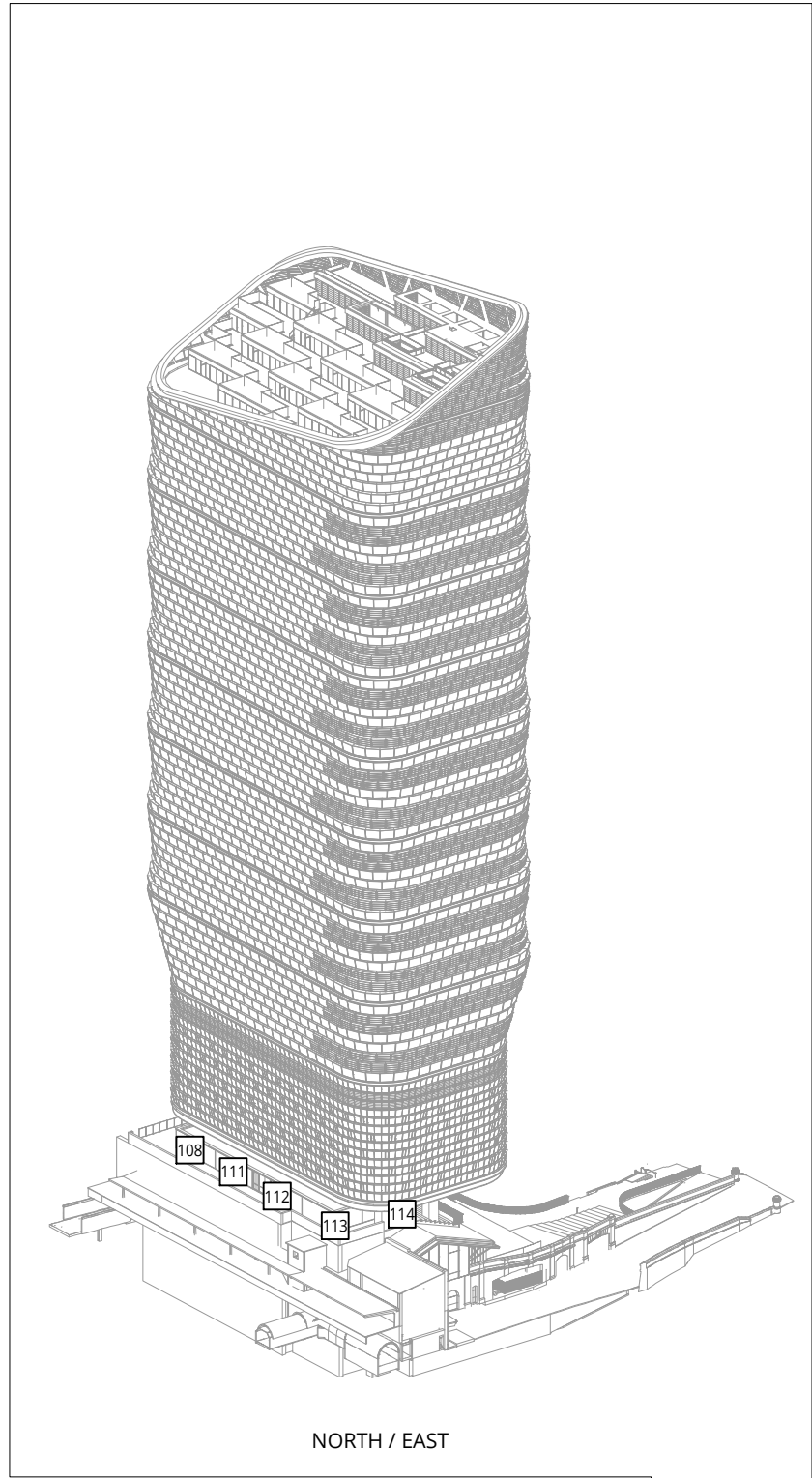
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



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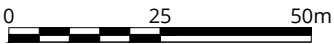
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SENSOR LOCATION:

○ Ground Level

□ Podium Level

◇ Balcony/Roof Level



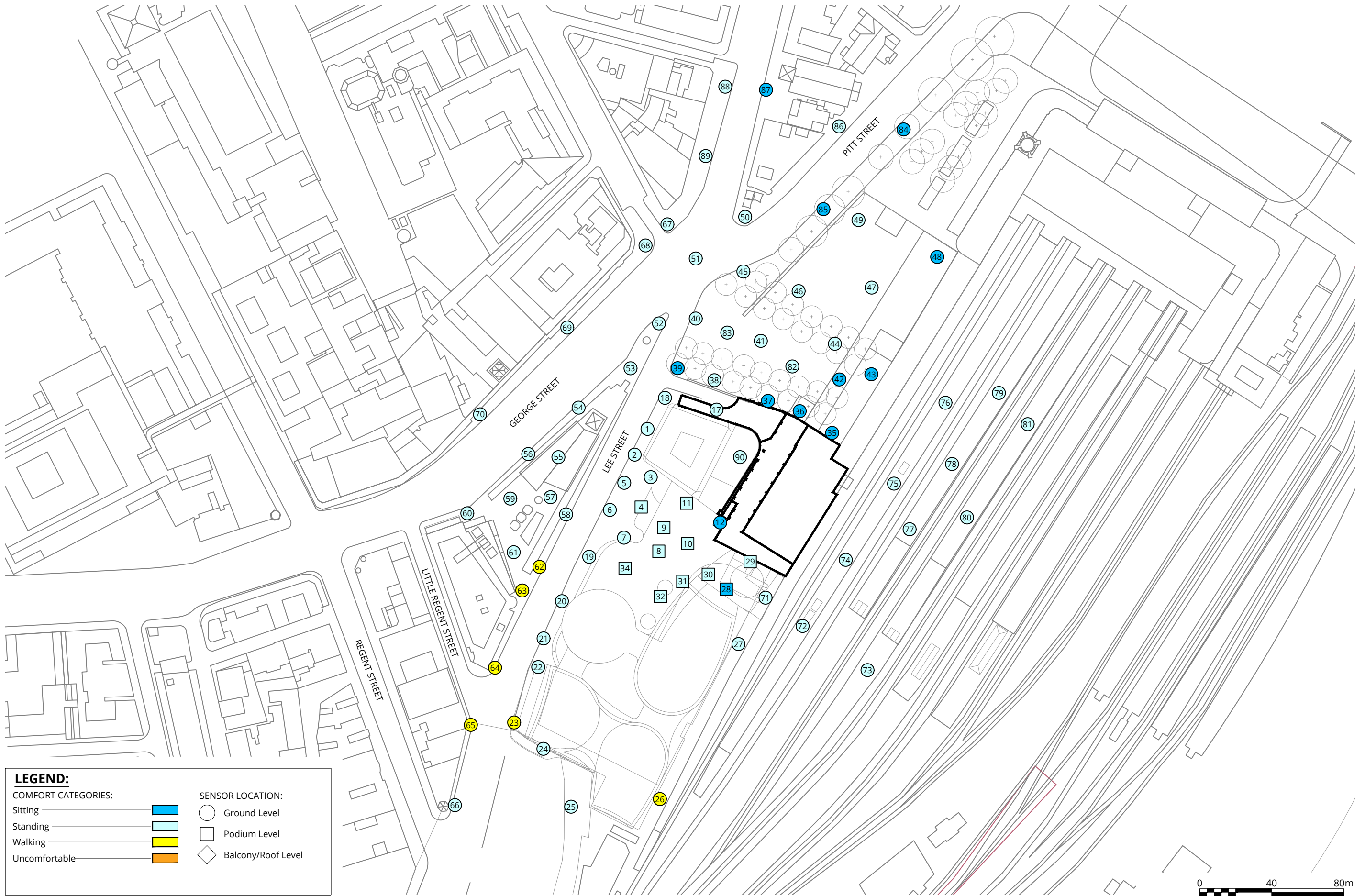
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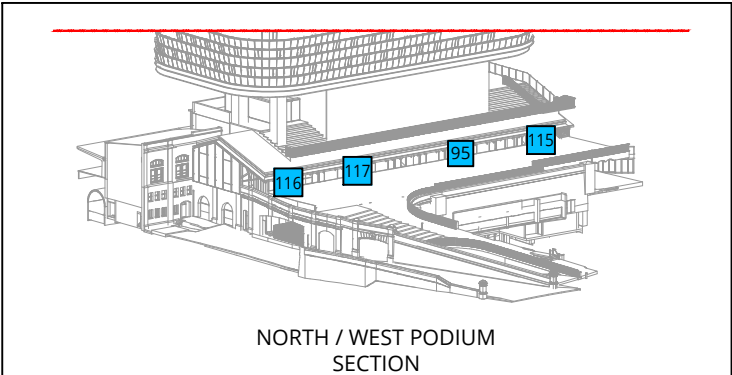
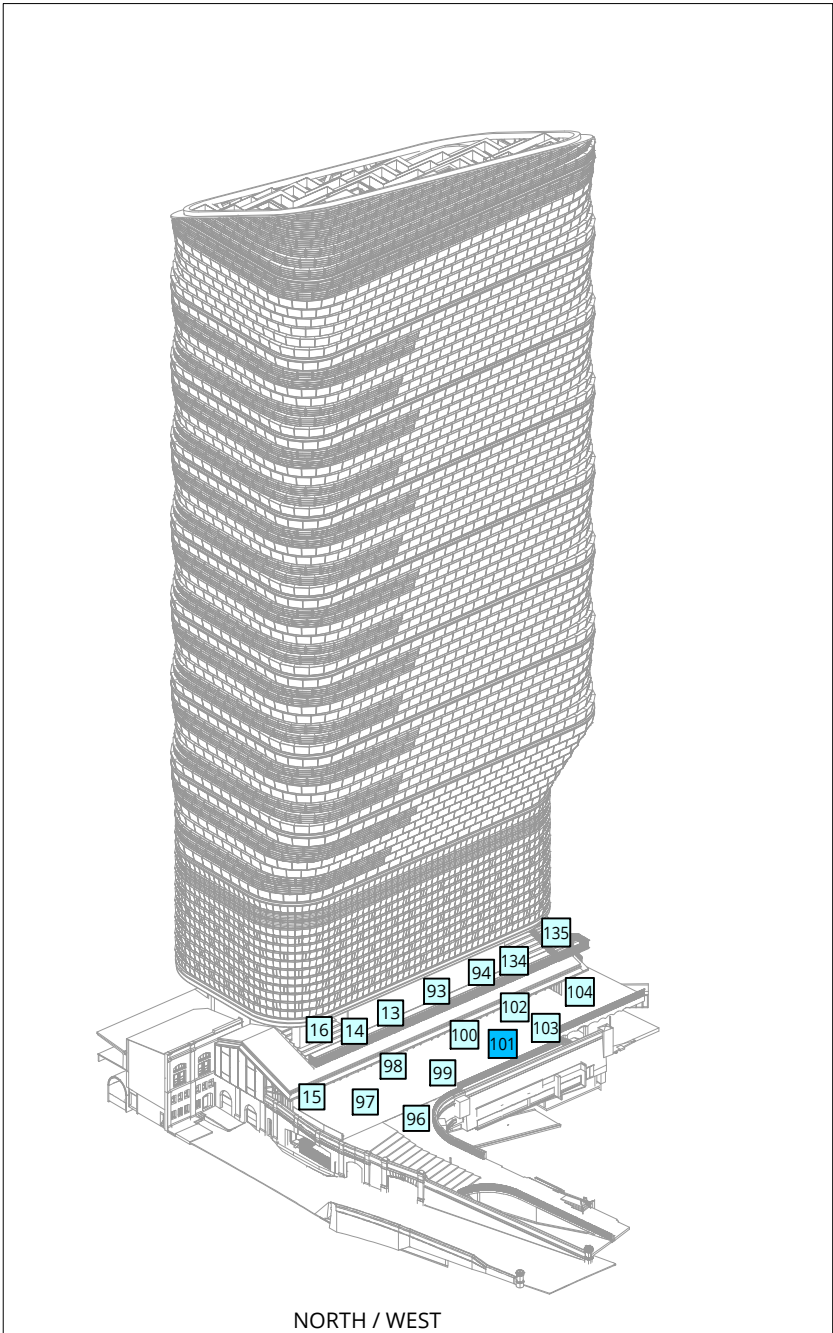
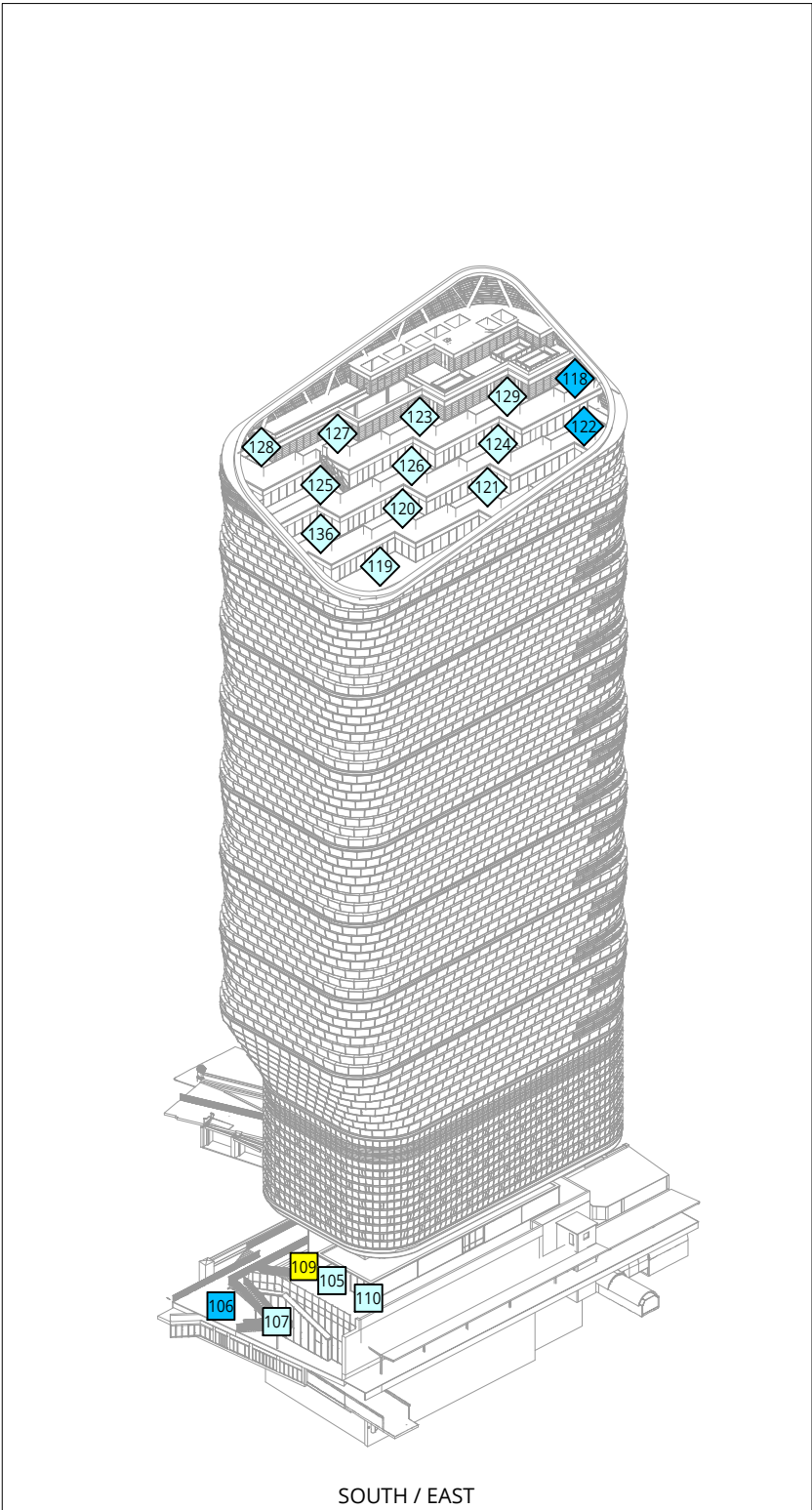
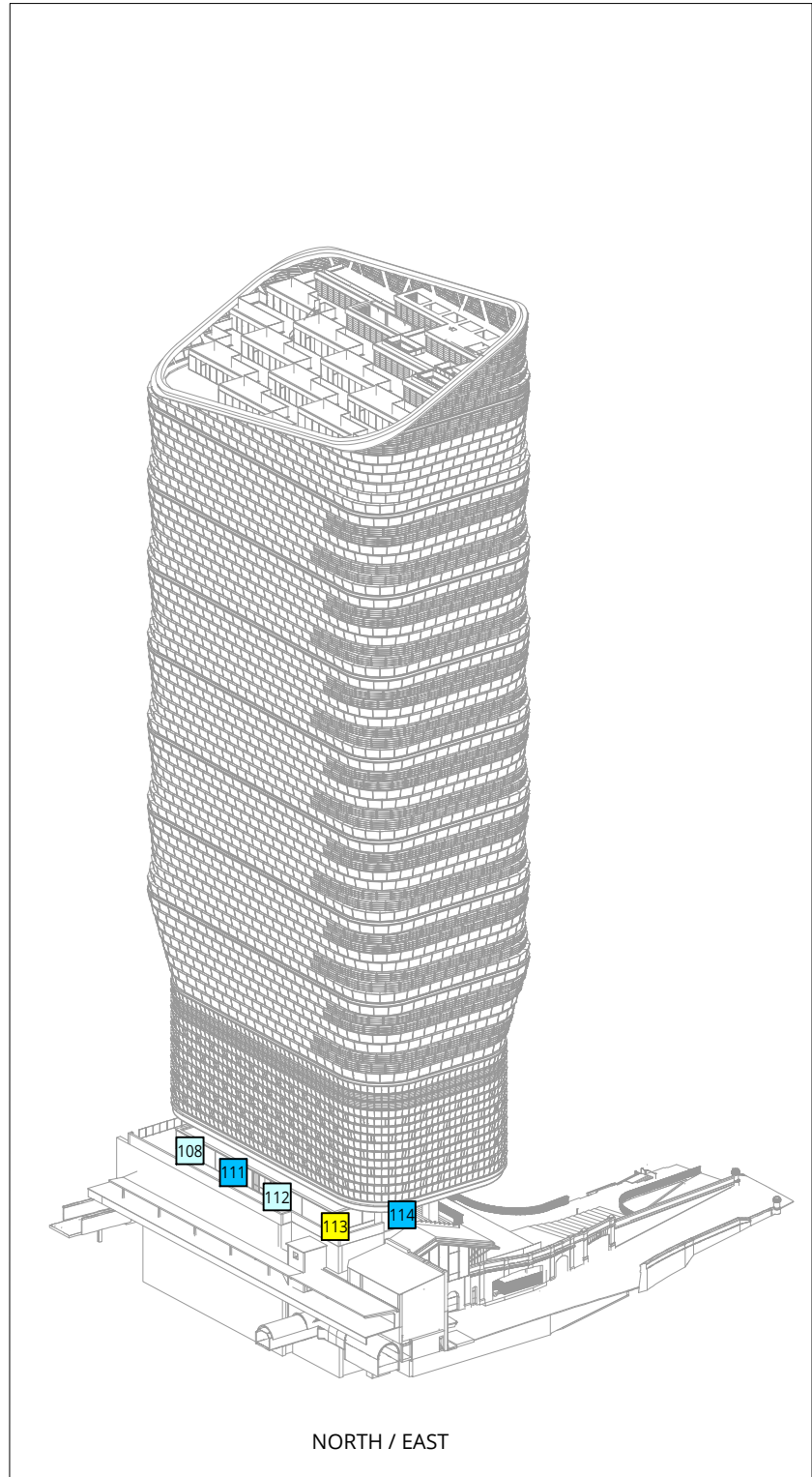
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COMFORT CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortable

SENSOR LOCATION:

- Ground Level
- Podium Level
- Balcony/Roof Level



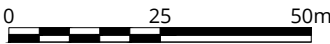
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- Standing —
- Walking —
- Uncomfortable —

SENSOR LOCATION:

- Ground Level
- Podium Level
- Balcony/Roof Level



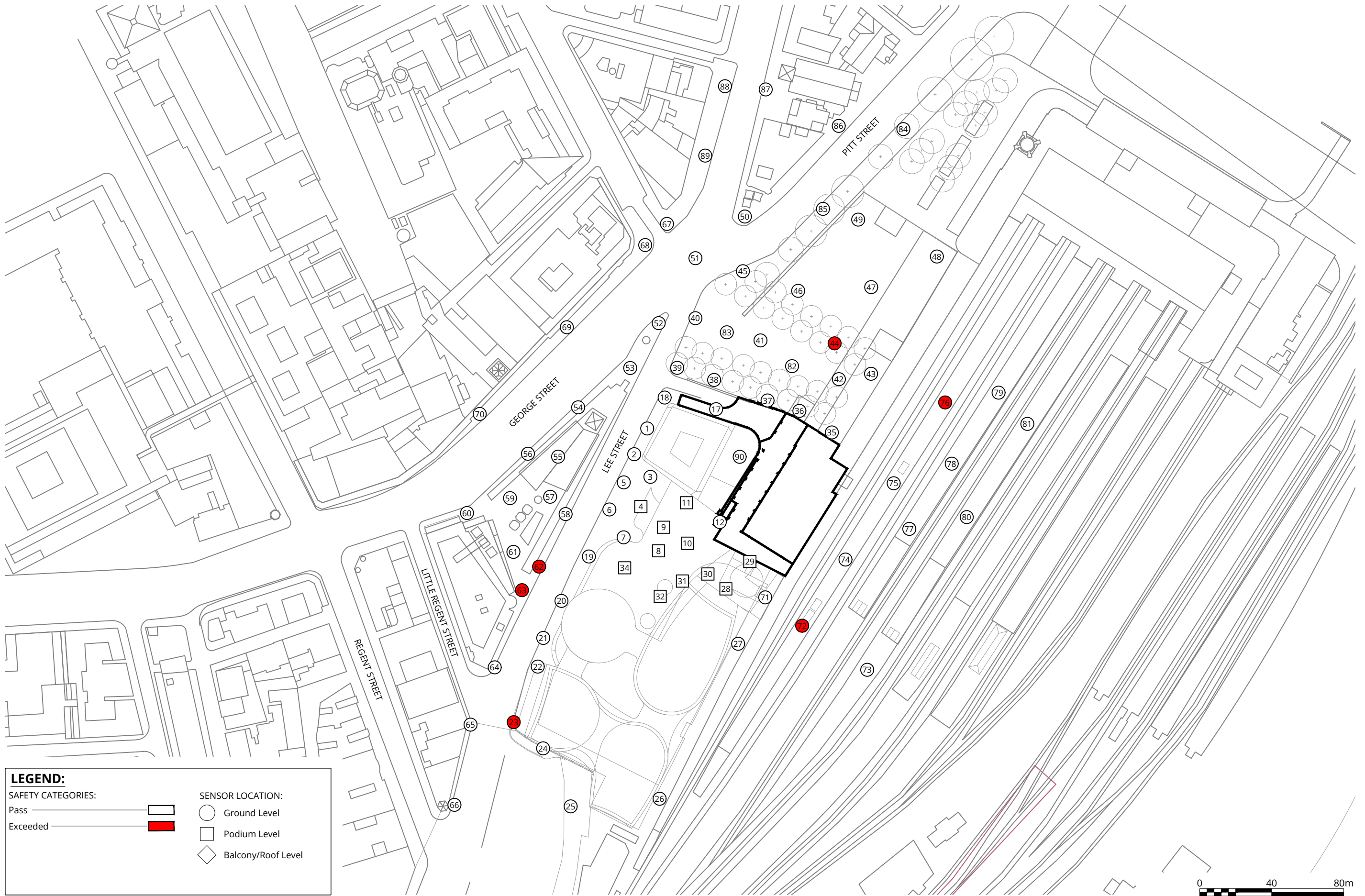
Pedestrian Wind Comfort Conditions - Elevated Levels
 Configuration 3: Proposed Block A and B Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures
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Pedestrian Wind Safety Conditions - Ground Floor
 Configuration 3: Proposed Block A and B Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures
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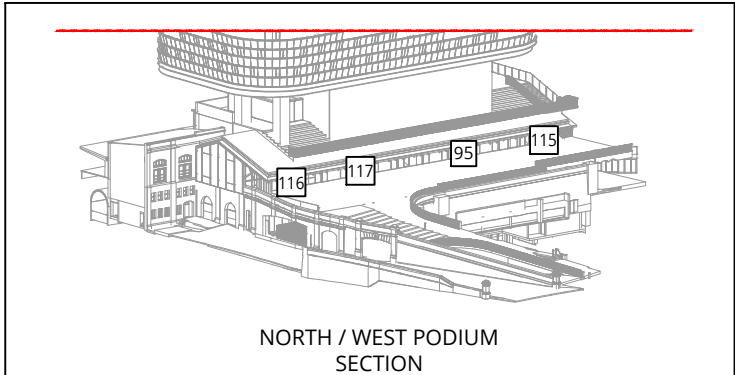
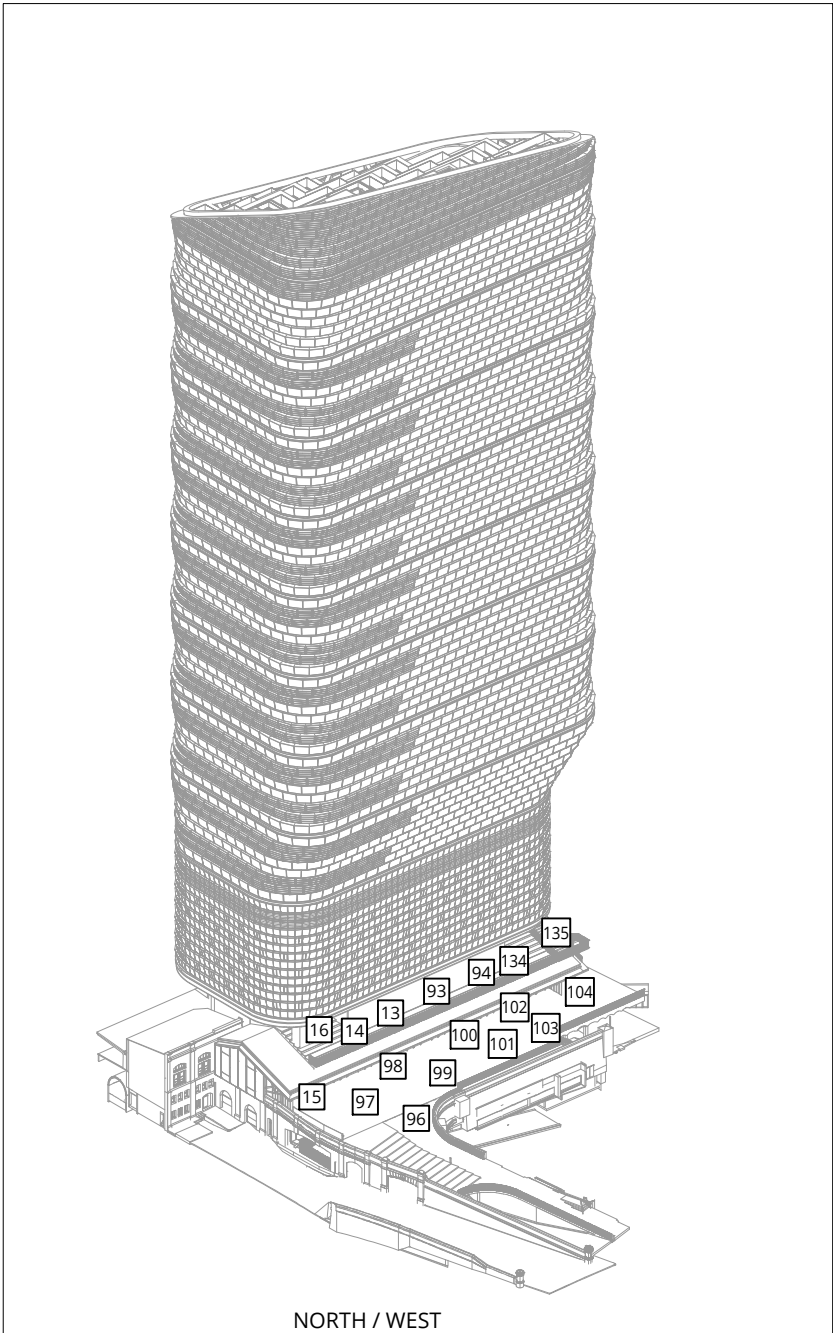
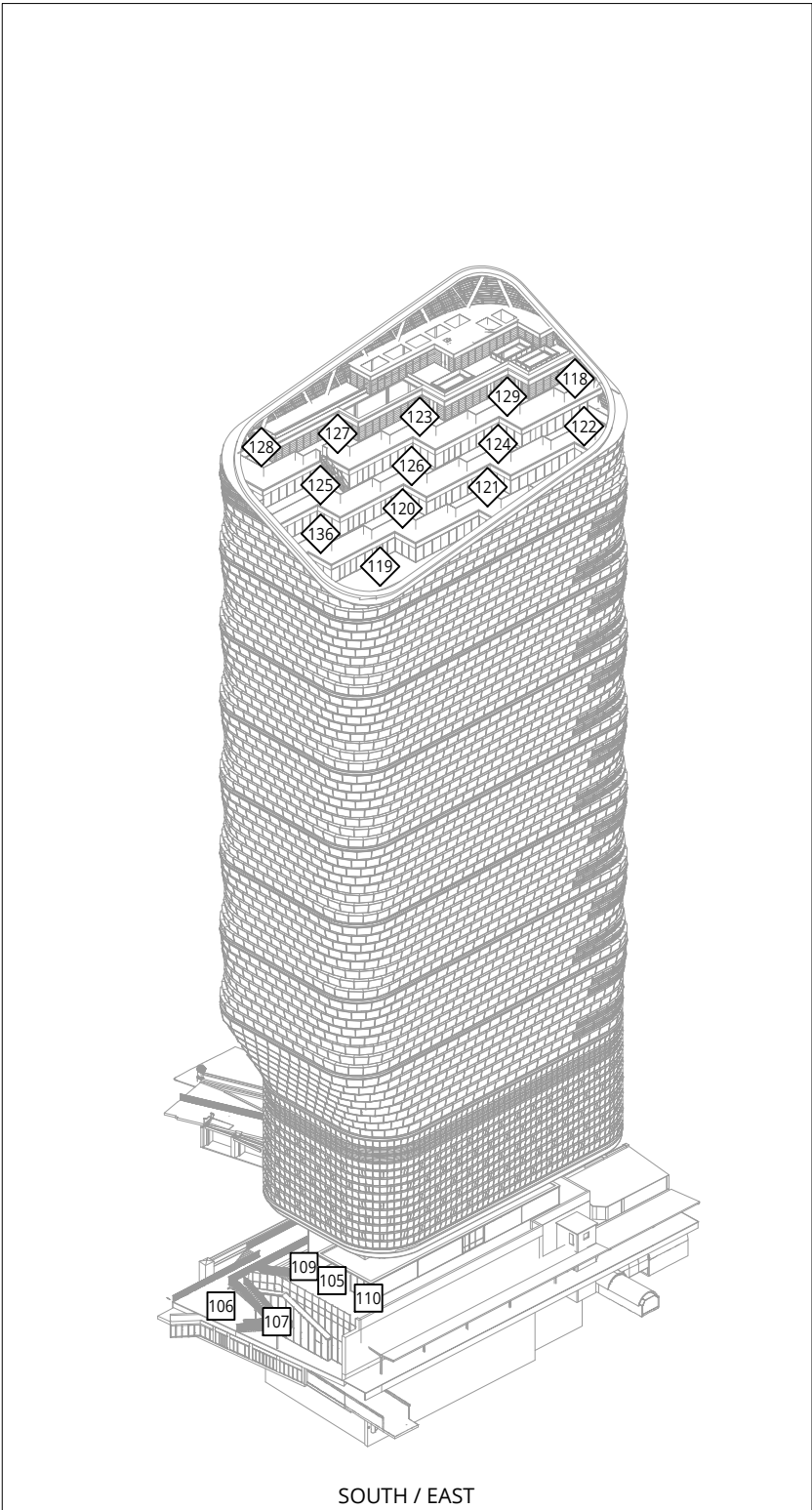
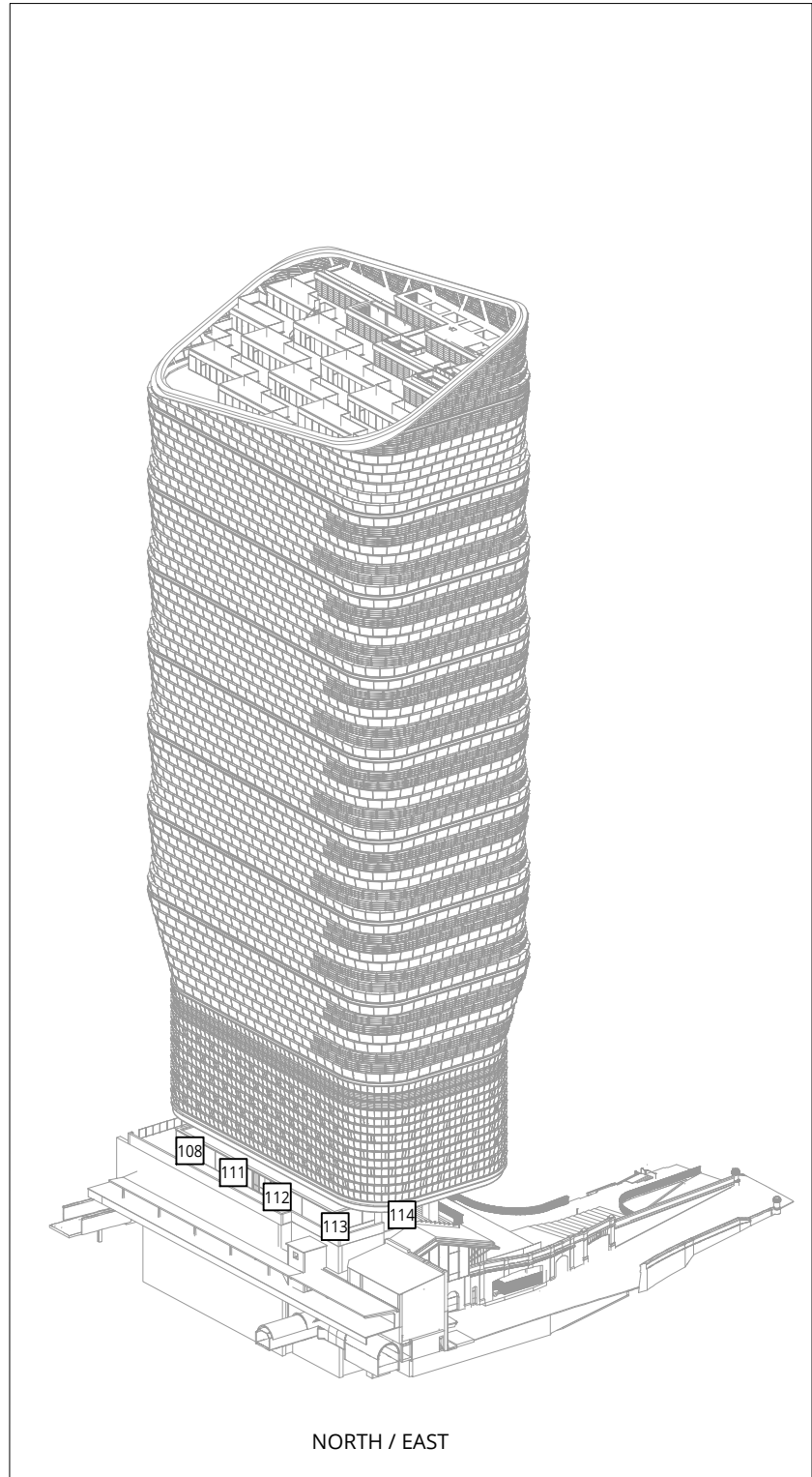
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



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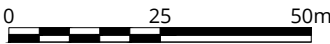
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SENSOR LOCATION:

 Ground Level

 Podium Level

 Balcony/Roof Level



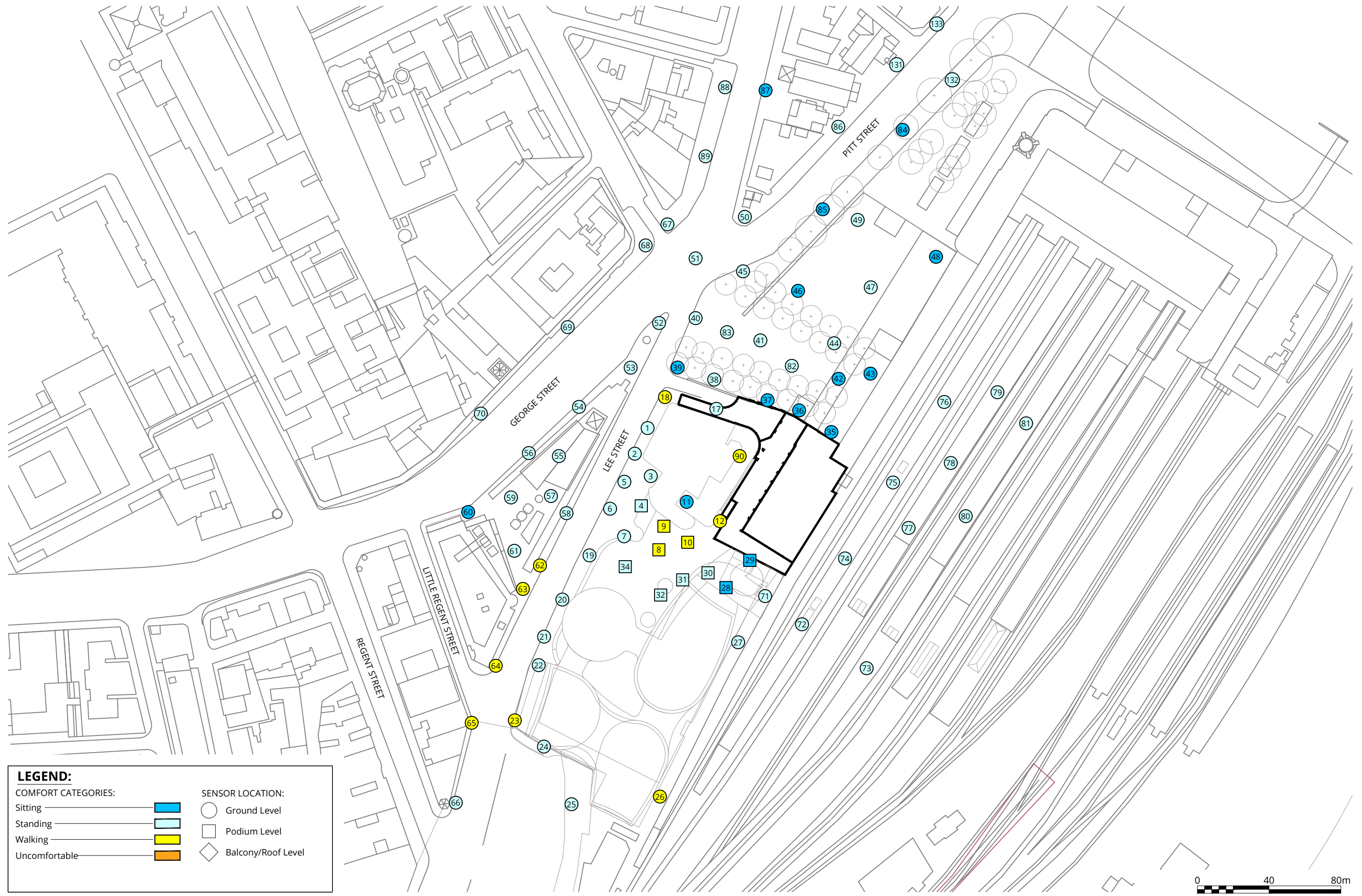
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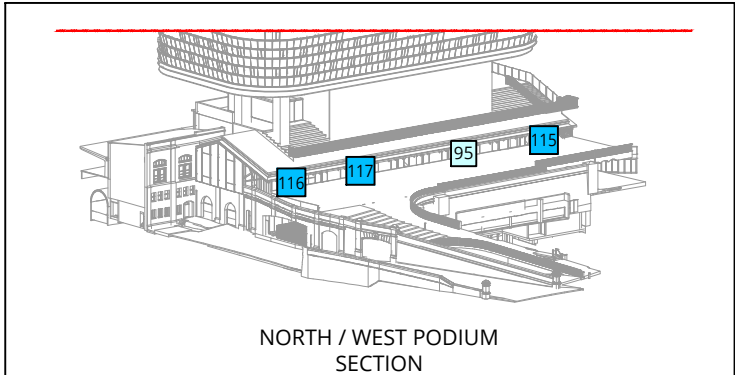
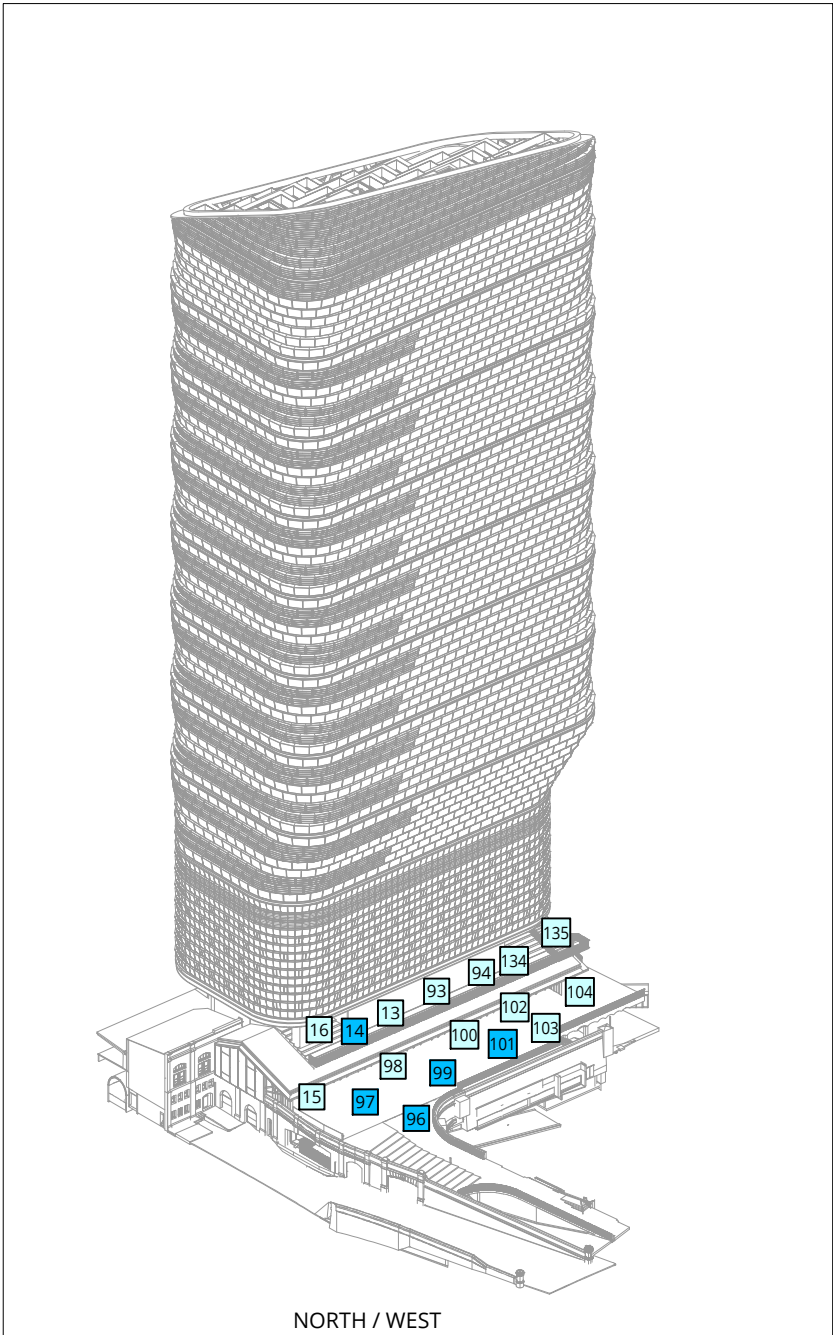
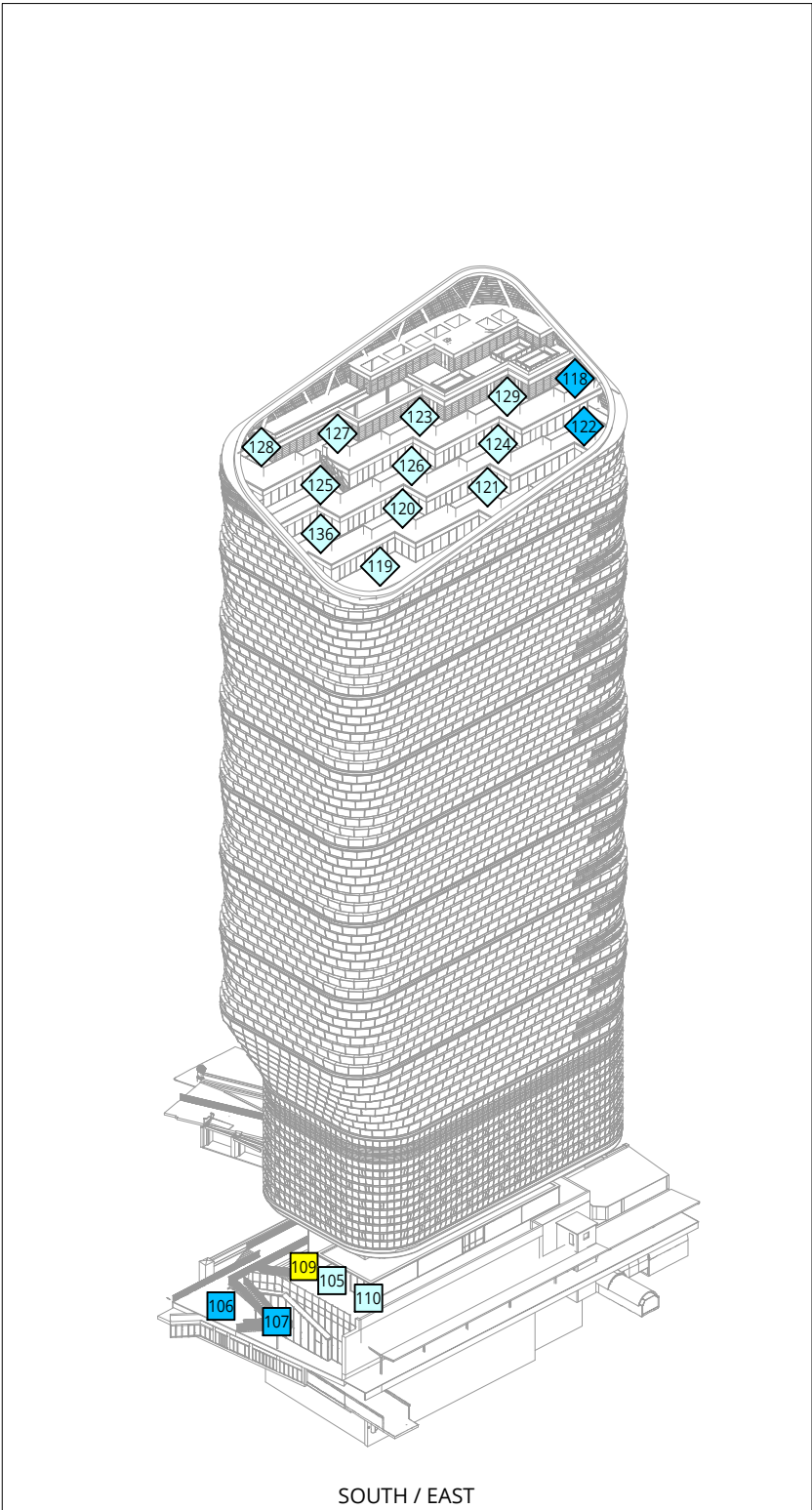
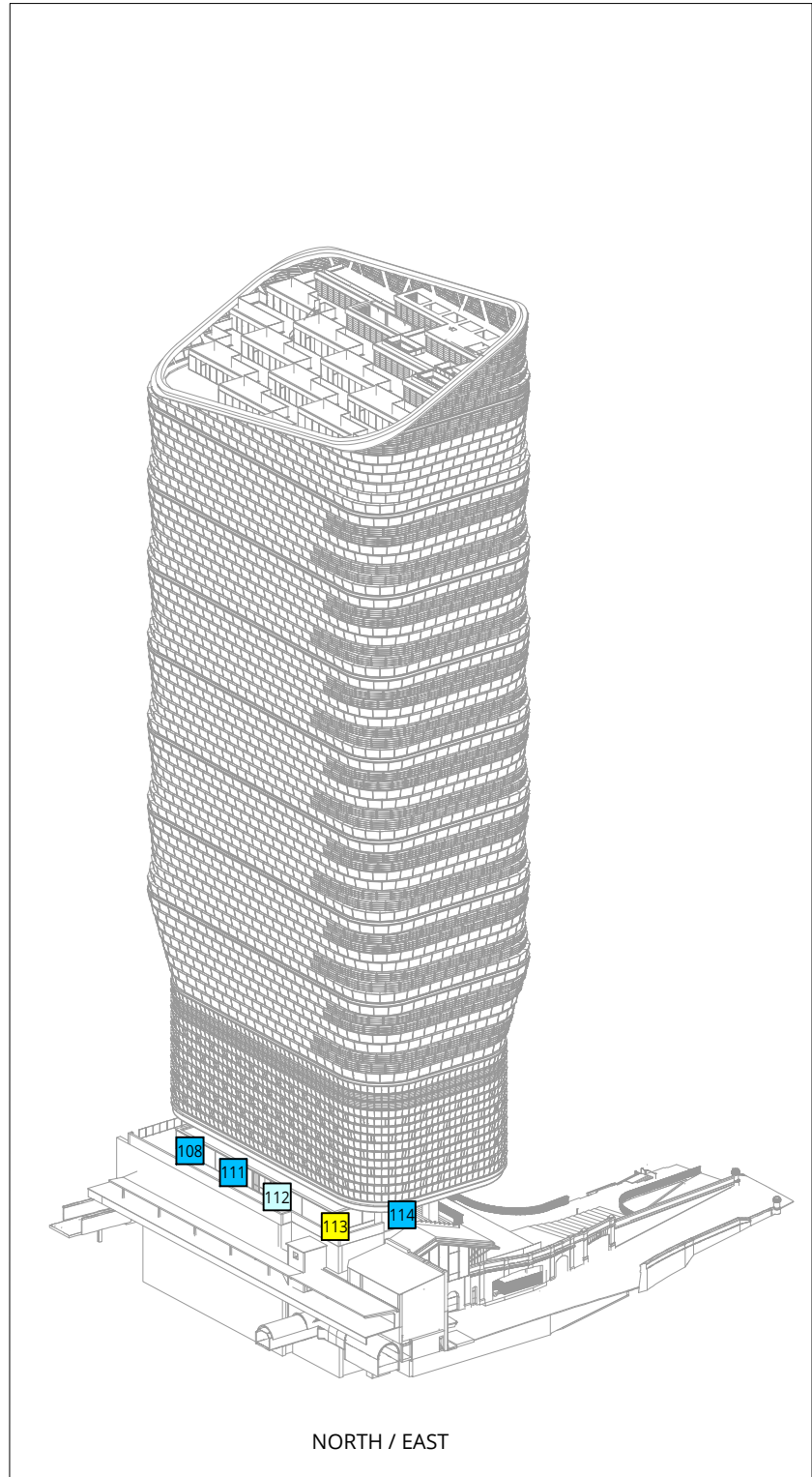
LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortable

SENSOR LOCATION:

- Ground Level
- Podium Level
- Balcony/Roof Level



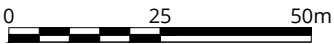
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- Standing —
- Walking —
- Uncomfortable —

SENSOR LOCATION:

- Ground Level
- Podium Level
- ◇ Balcony/Roof Level



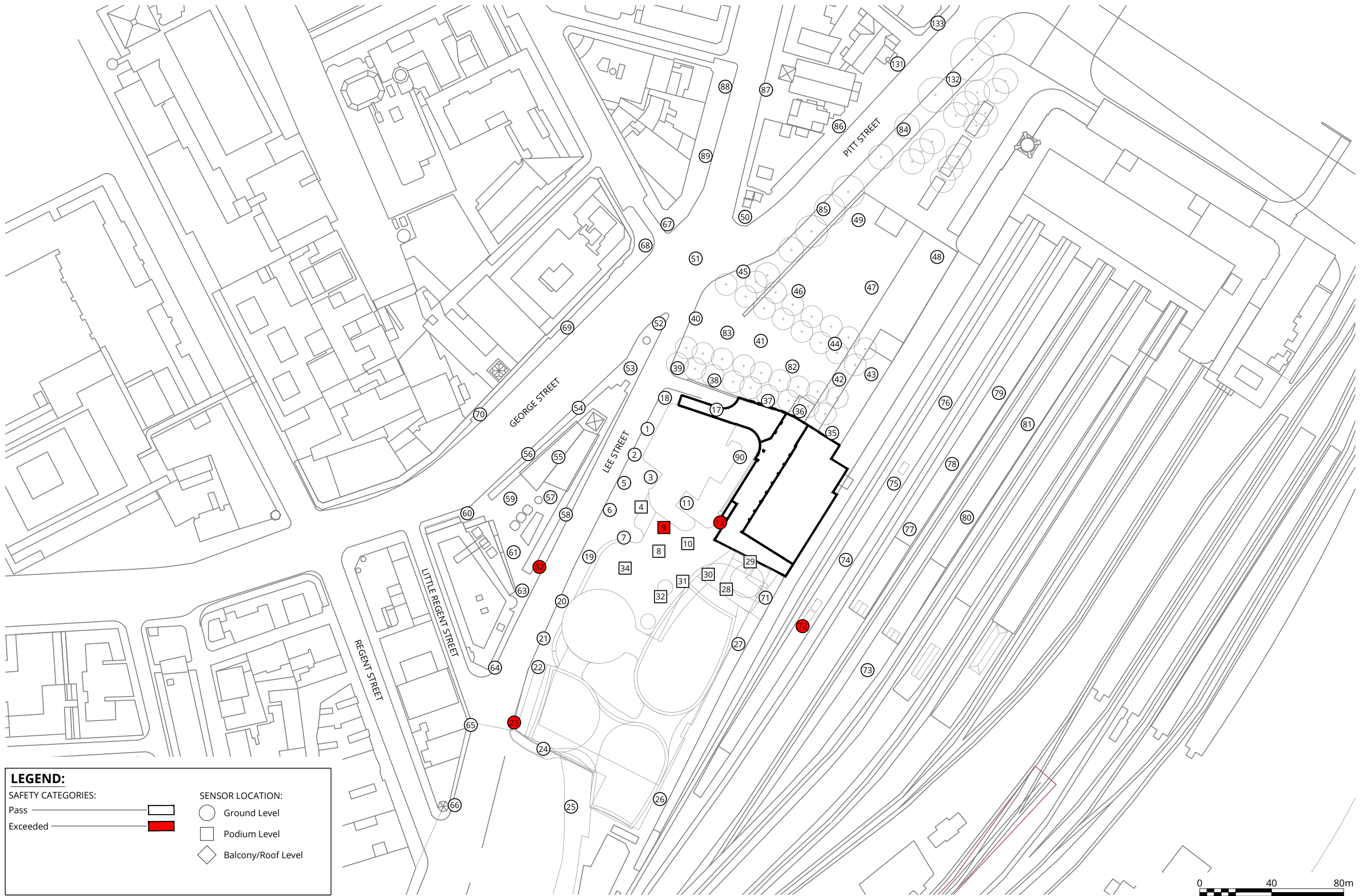
Pedestrian Wind Comfort Conditions - Elevated Levels
 Configuration 4: Proposed Block A, B and C Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping and Wind Mitigation Measures
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
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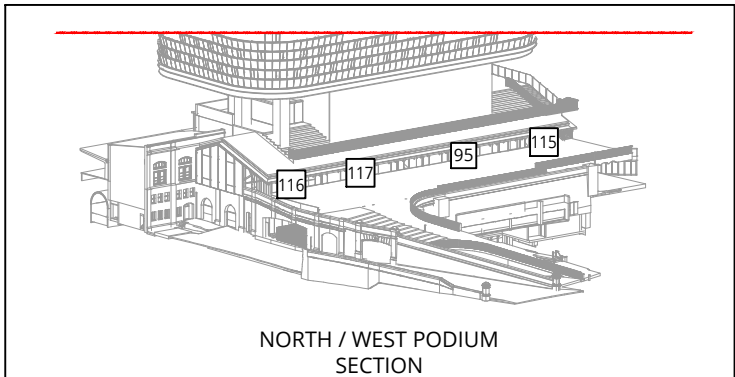
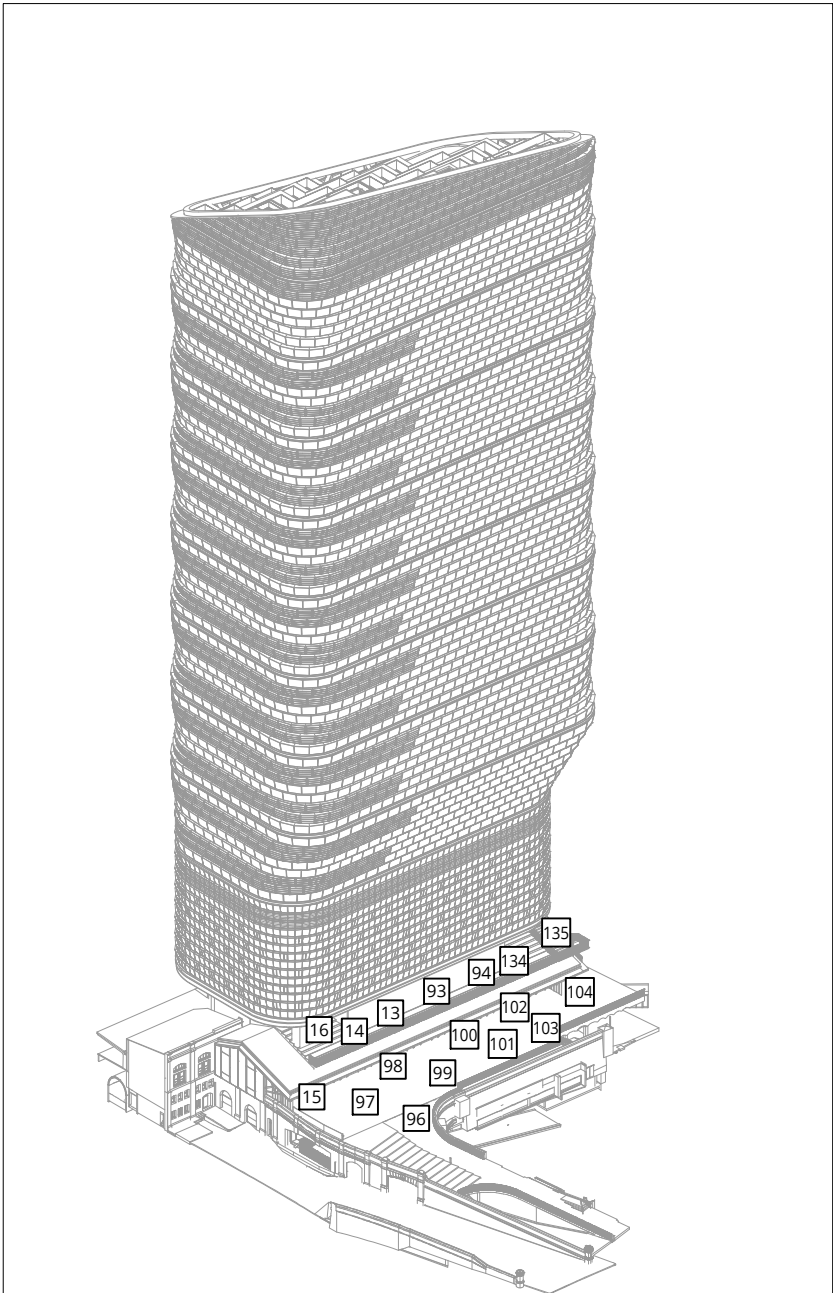
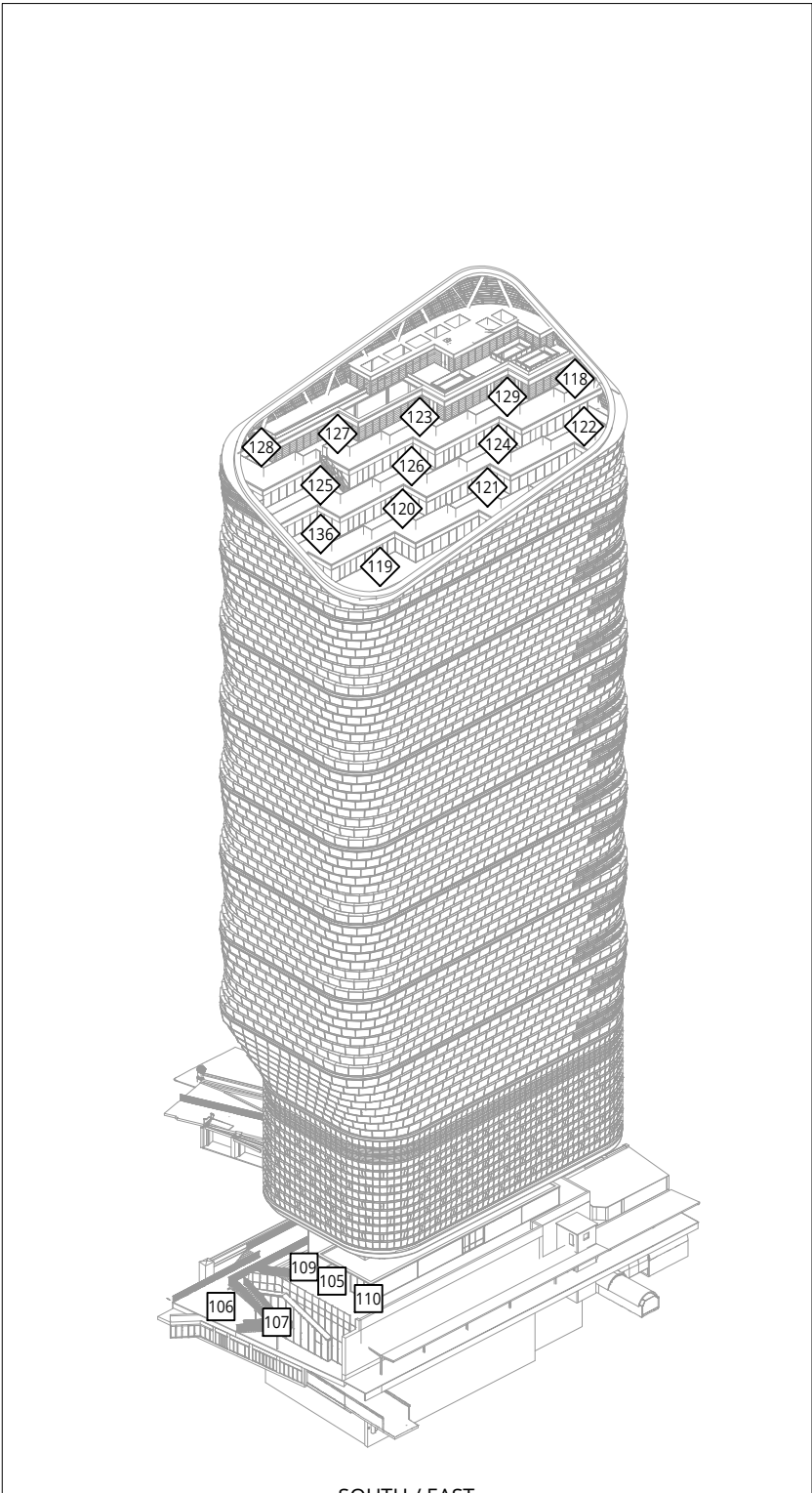
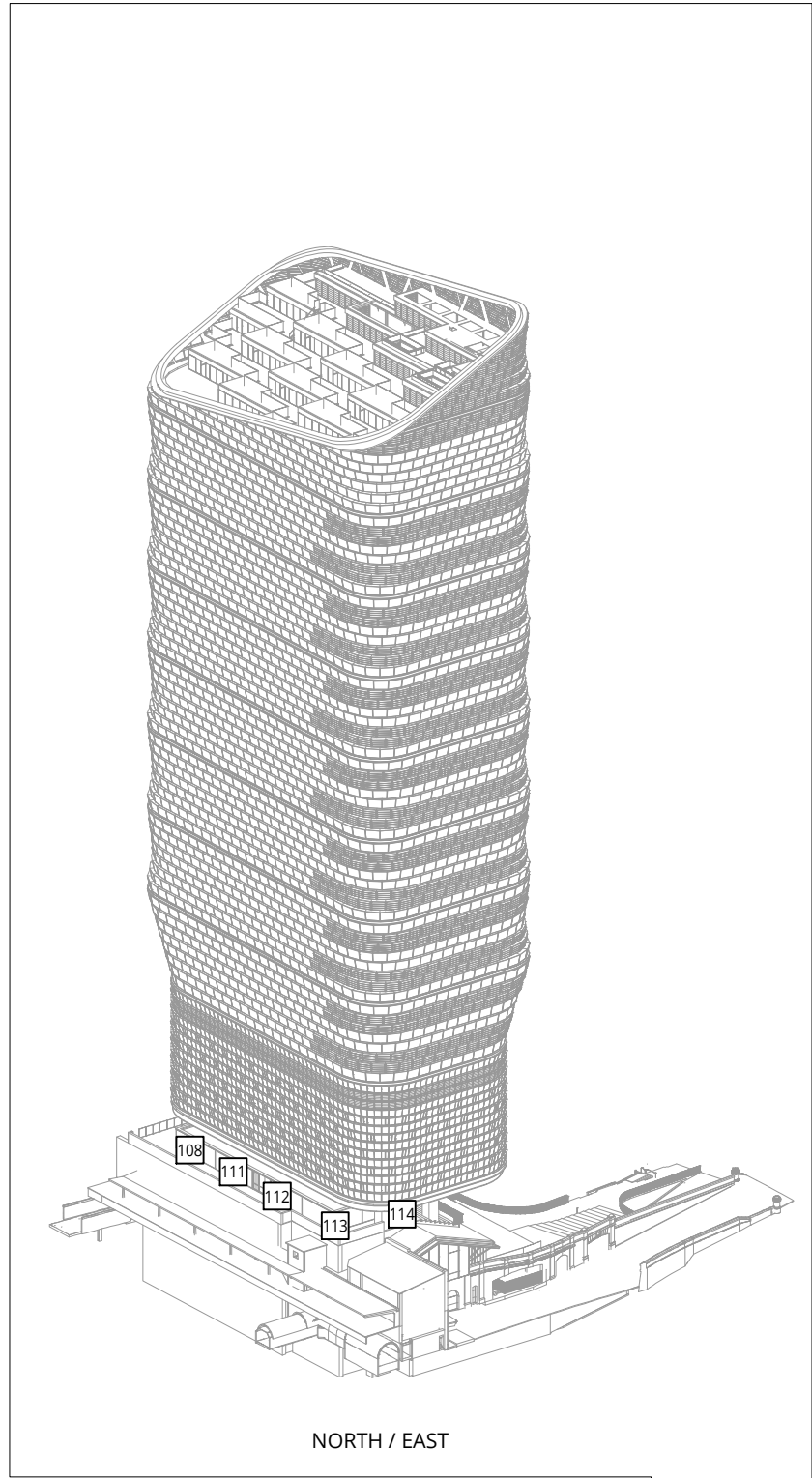
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SENSOR LOCATION:

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
□ Podium Level


◇ Balcony/Roof Level



LEGEND:

SAFETY CATEGORIES:

Pass — 

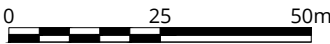
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SENSOR LOCATION:

○ Ground Level

□ Podium Level

◇ Balcony/Roof Level



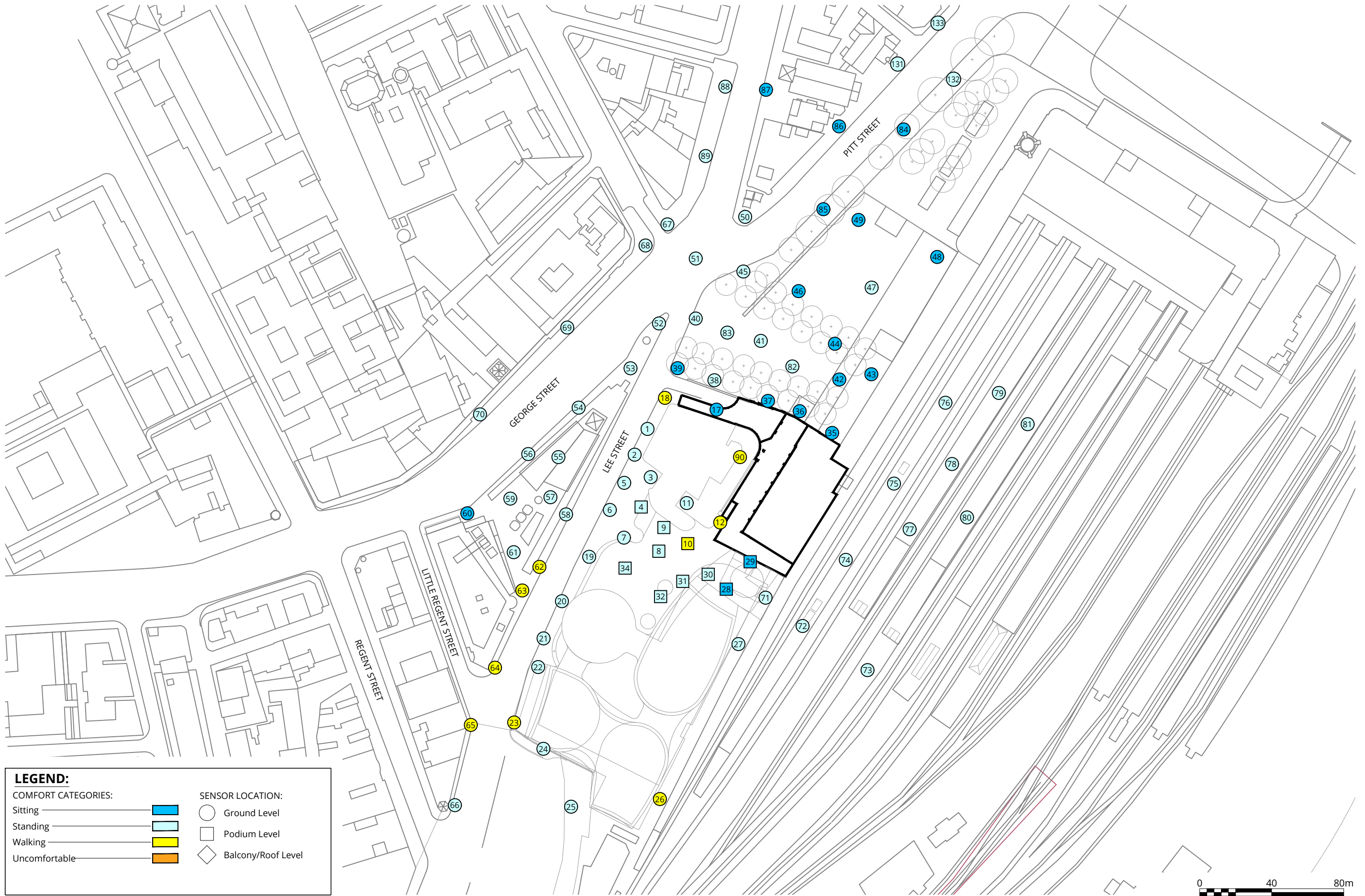
Pedestrian Wind Safety Conditions - Elevated Levels
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Approx. Scale @A3: 1:1250	
Date Revised: Apr. 23, 2021	





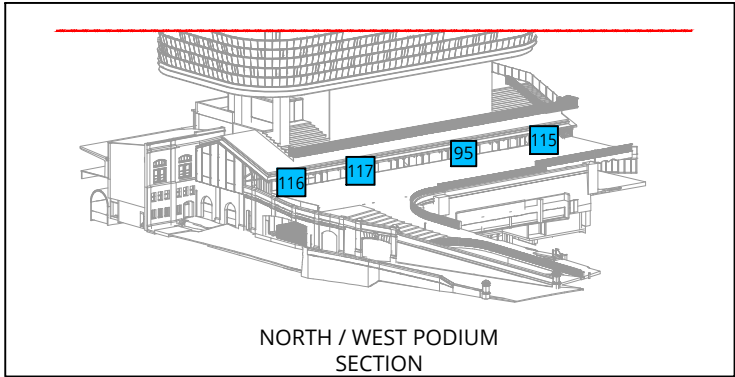
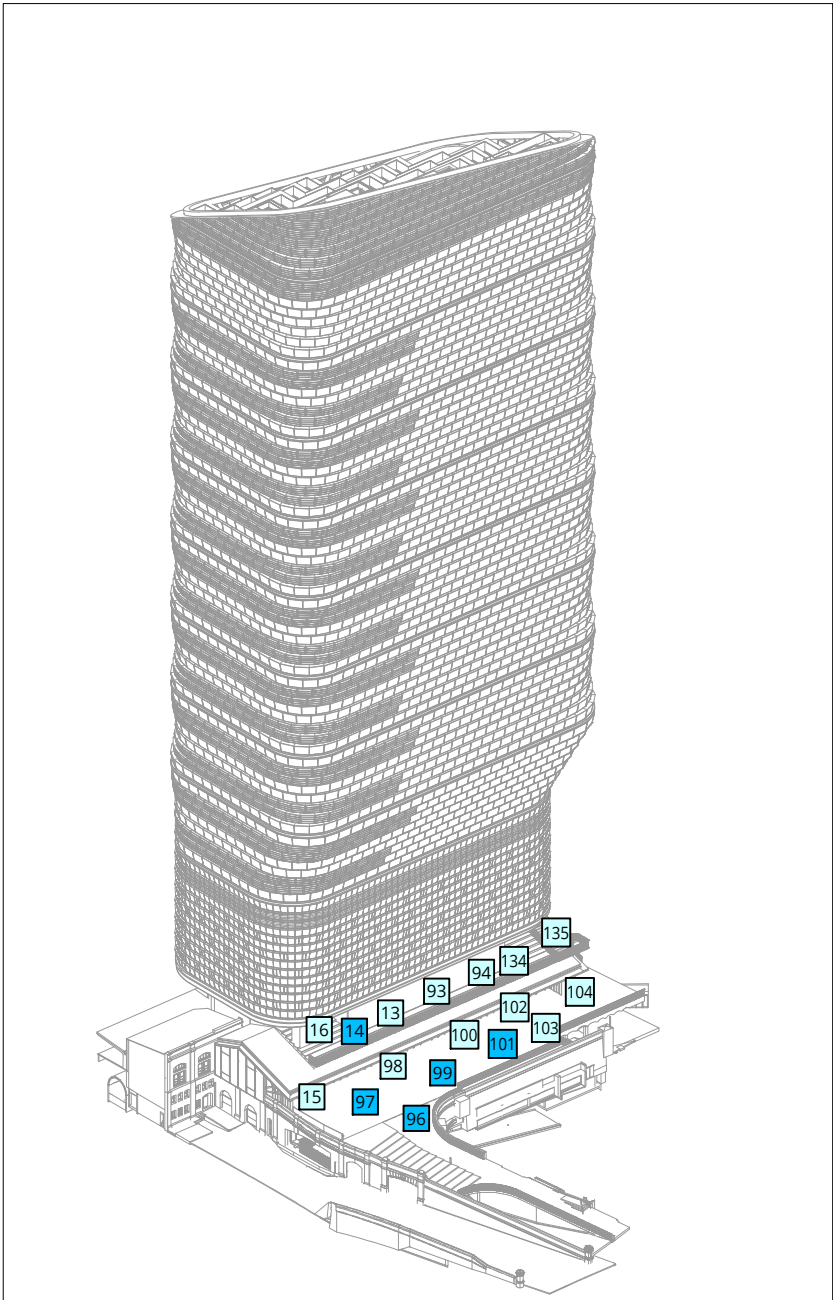
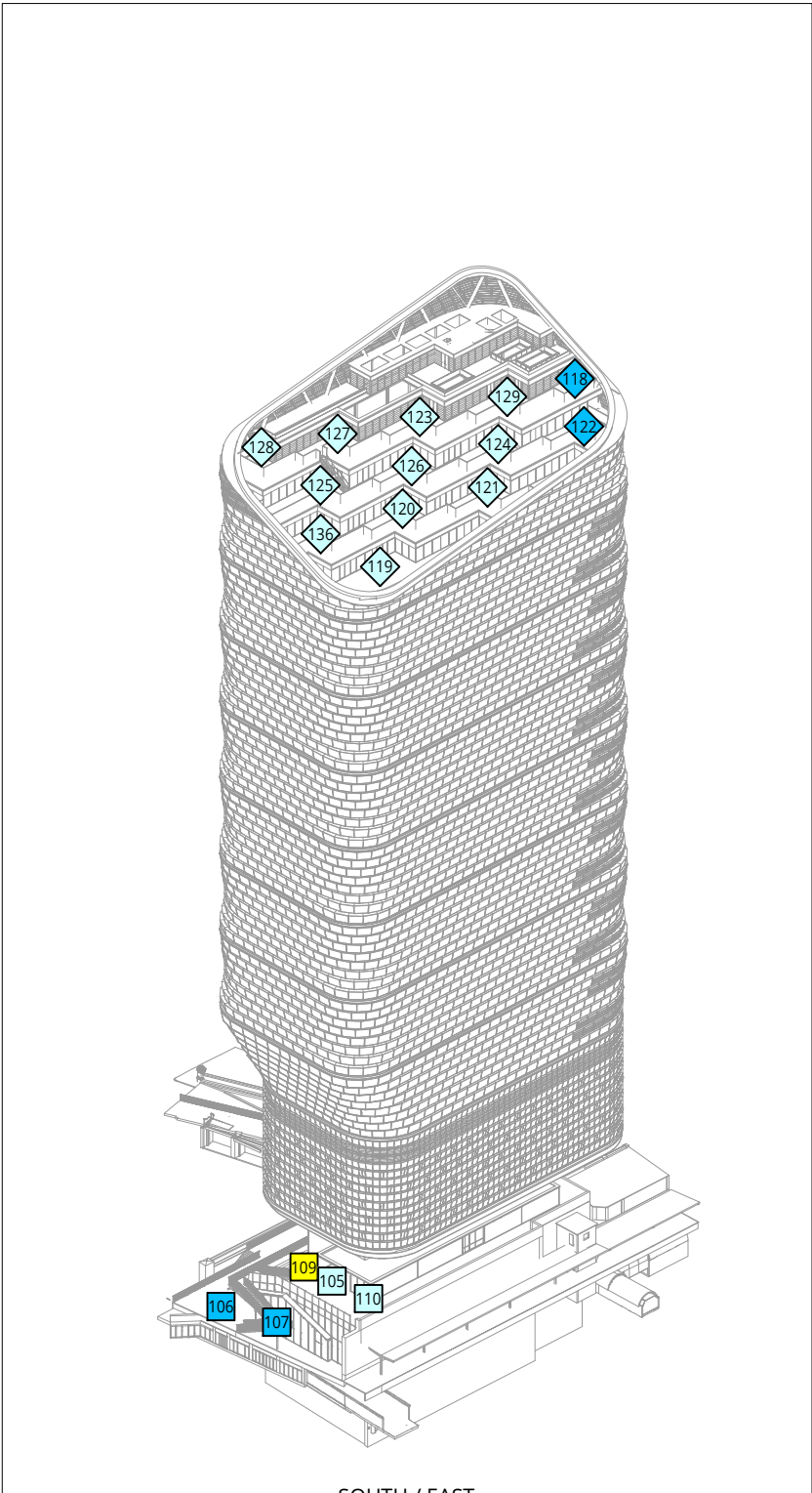
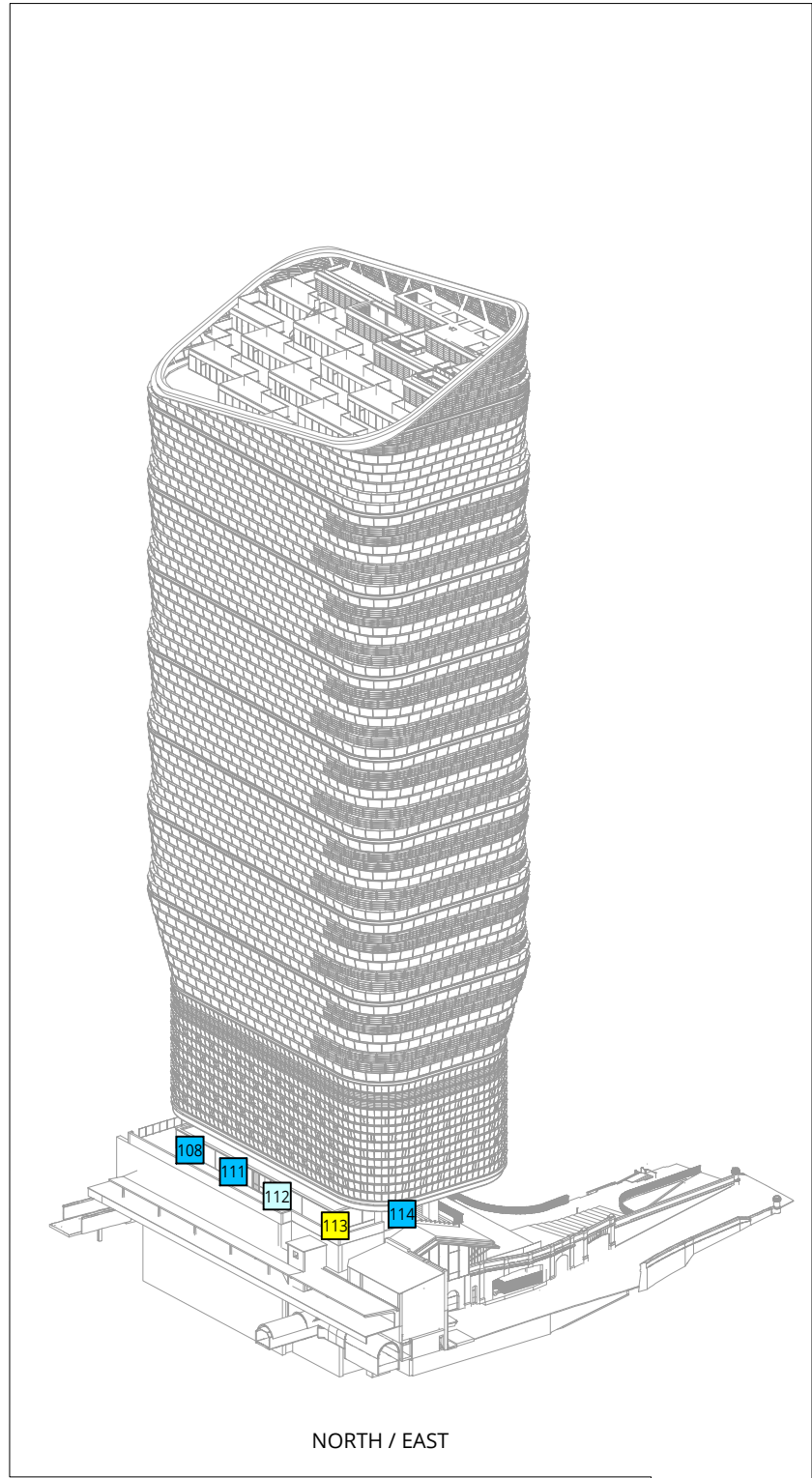
LEGEND:

COMFORT CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortable

SENSOR LOCATION:

- Ground Level
- Podium Level
- Balcony/Roof Level



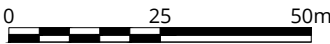
LEGEND:

COMFORT CATEGORIES:

- Sitting —
- Standing —
- Walking —
- Uncomfortable —

SENSOR LOCATION:

- Ground Level
- Podium Level
- ◇ Balcony/Roof Level



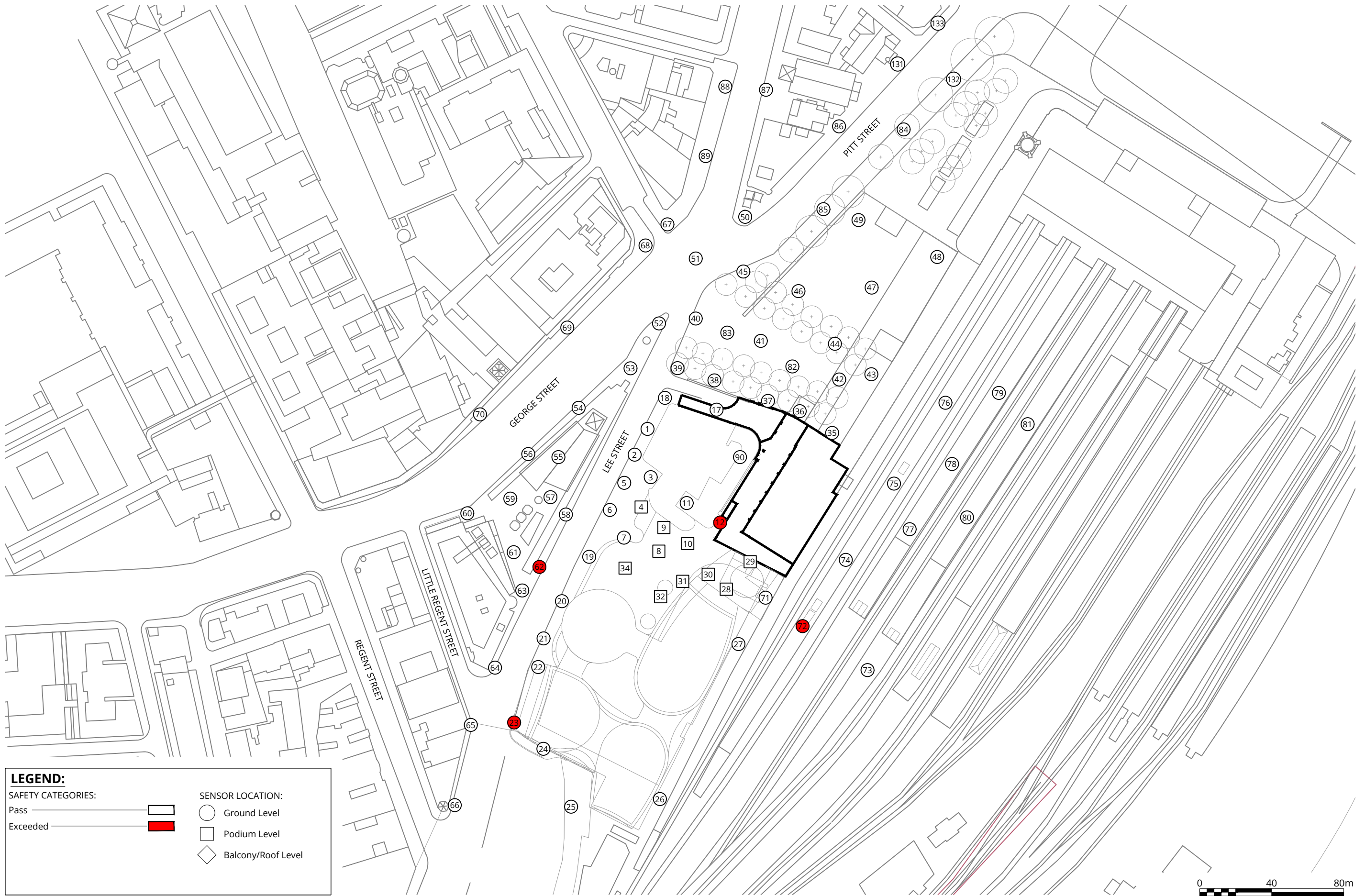
Pedestrian Wind Comfort Conditions - Elevated Levels
 Configuration 4A: Proposed Block A, B and C Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping, Wind Mitigation Measures and Angled Pavilion Structure
 Annual

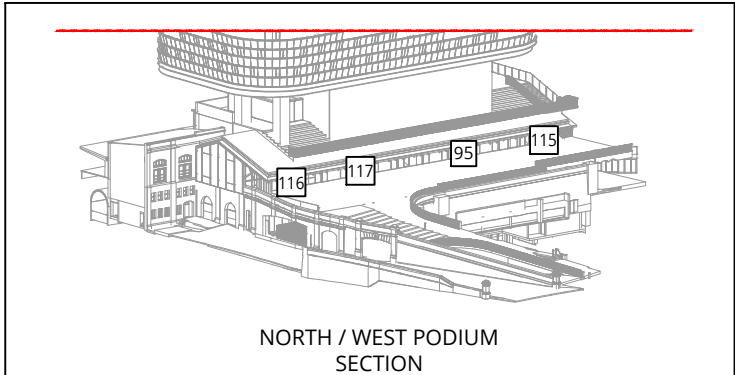
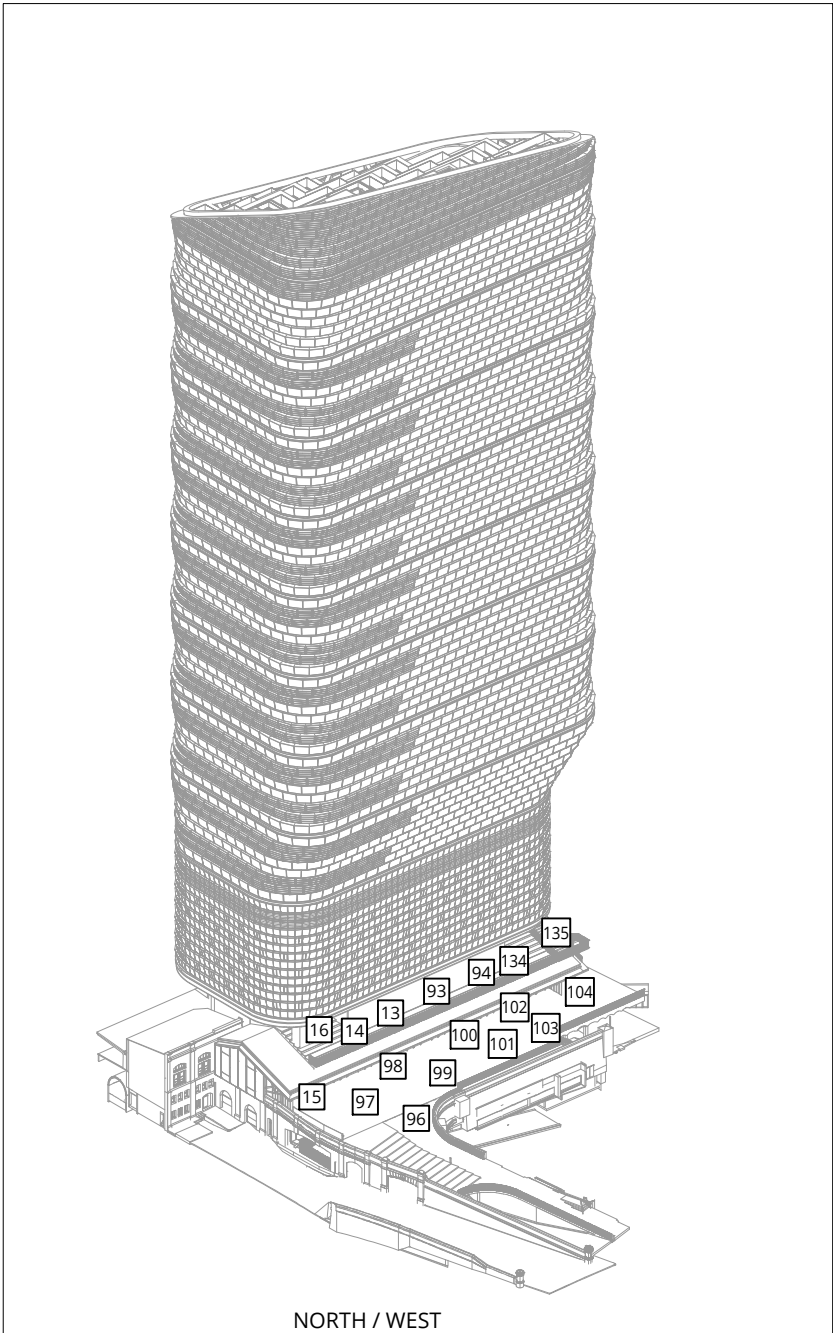
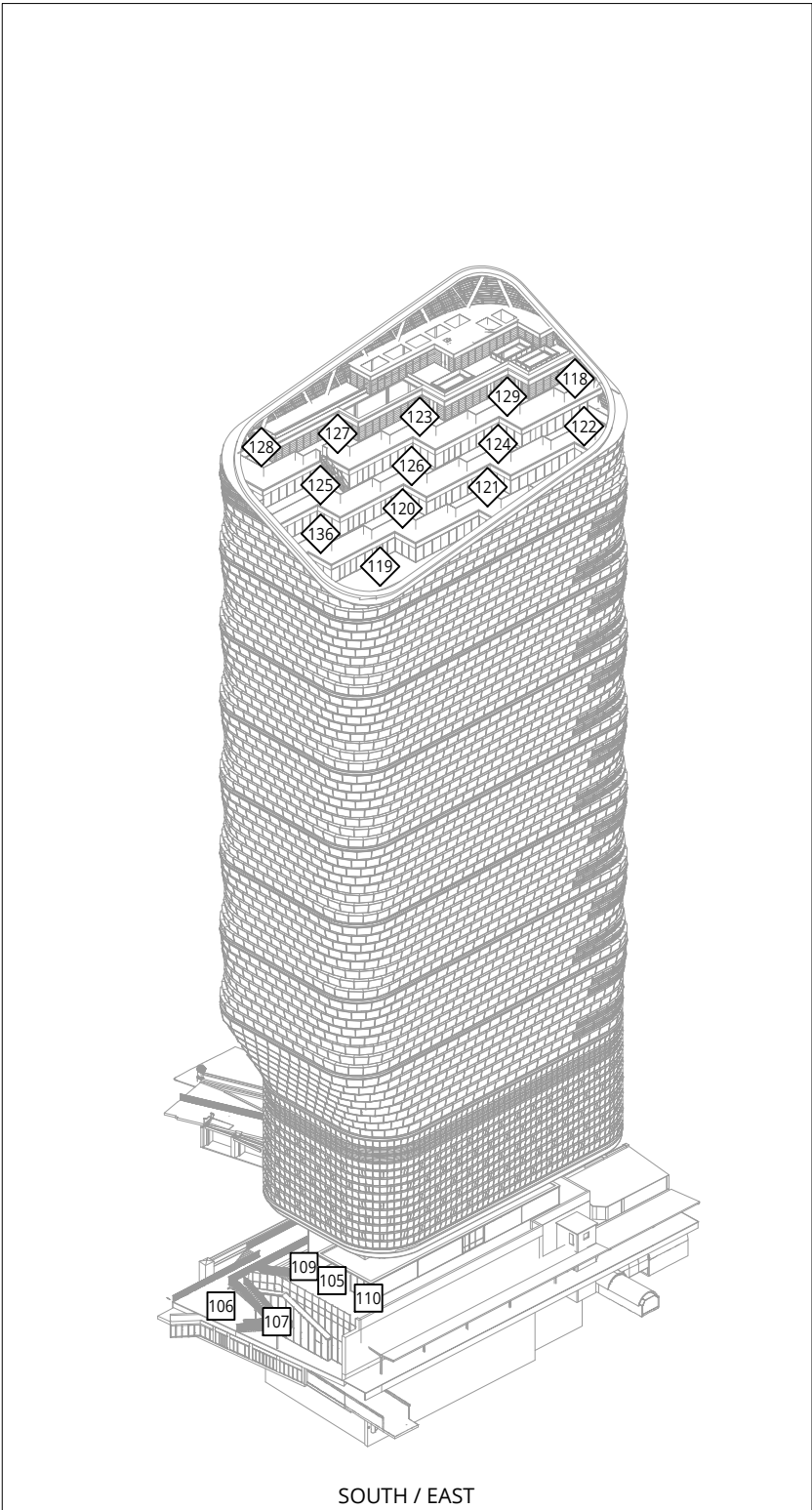
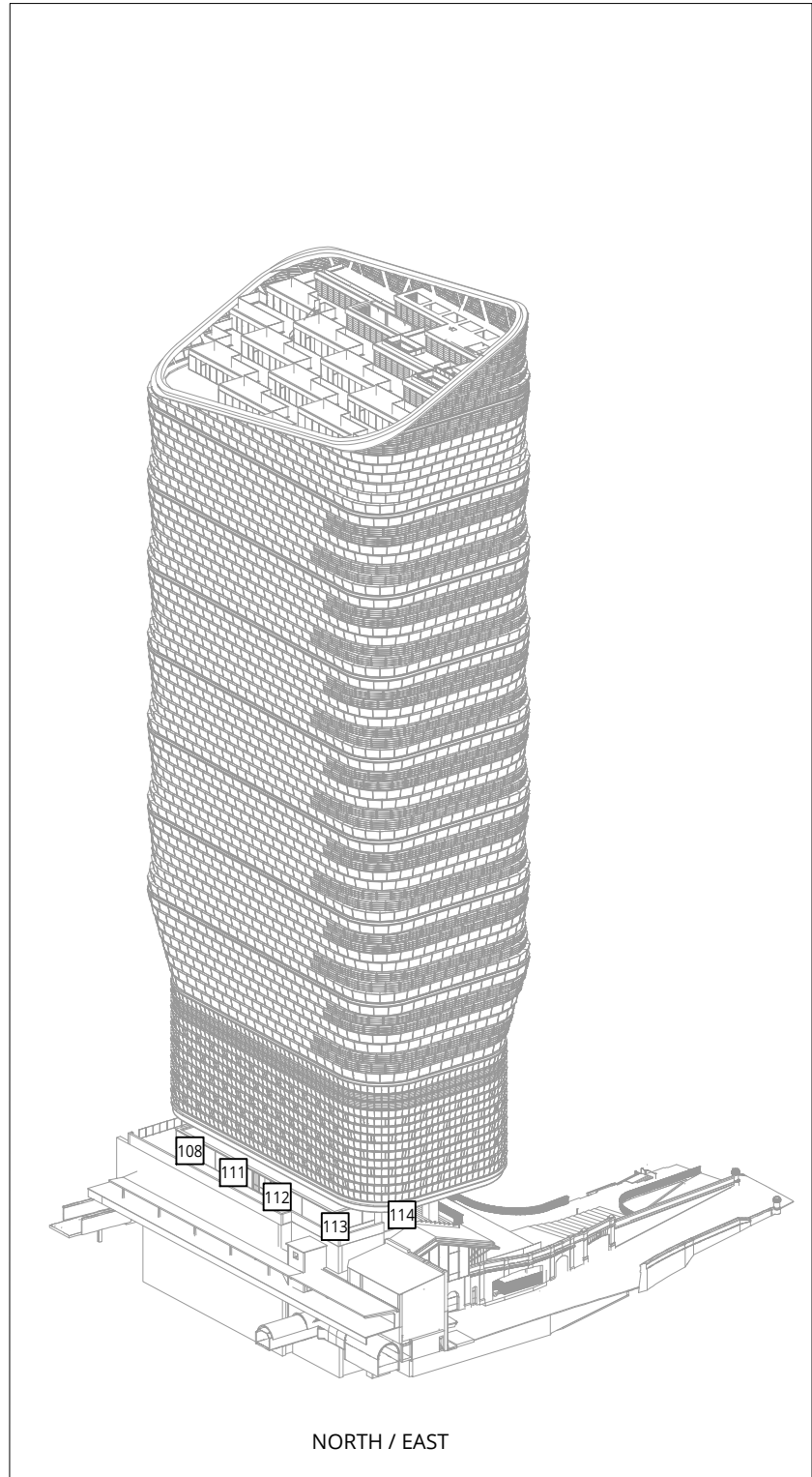
Atlassian Central - Sydney, Australia

Project #2100277

Drawn by: JLF	Figure: 16
Approx. Scale @A3: 1:1250	
Date Revised: Apr. 23, 2021	










LEGEND:


SAFETY CATEGORIES:


Pass ———— 

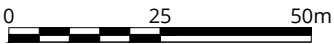
Exceeded ———— 

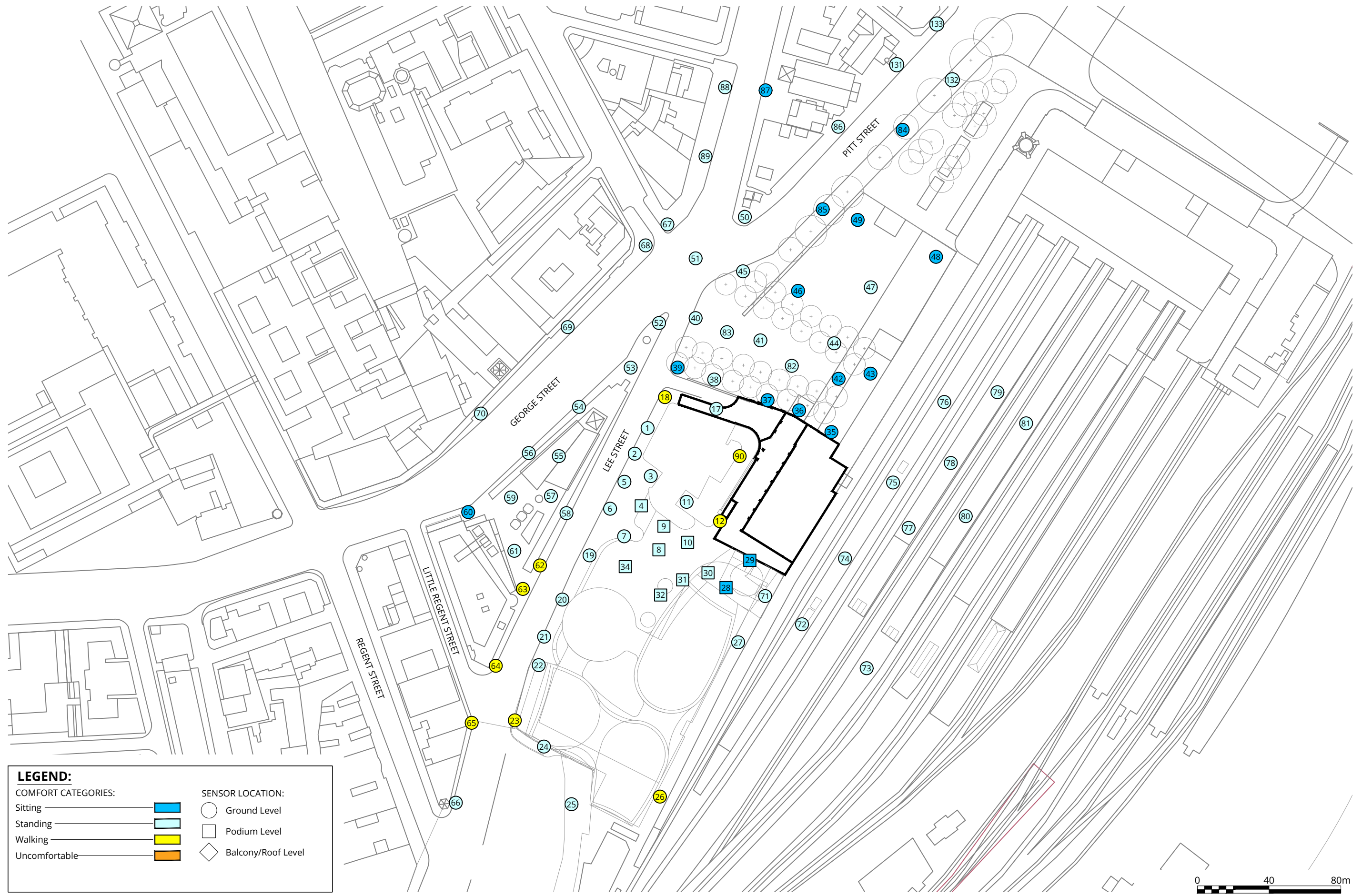
SENSOR LOCATION:

 Ground Level

 Podium Level

 Balcony/Roof Level





LEGEND:

COMFORT CATEGORIES:

Sitting	Blue
Standing	Light Blue
Walking	Yellow
Uncomfortable	Orange

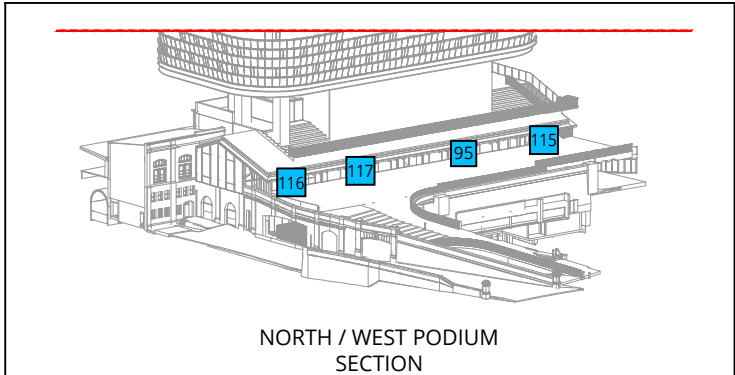
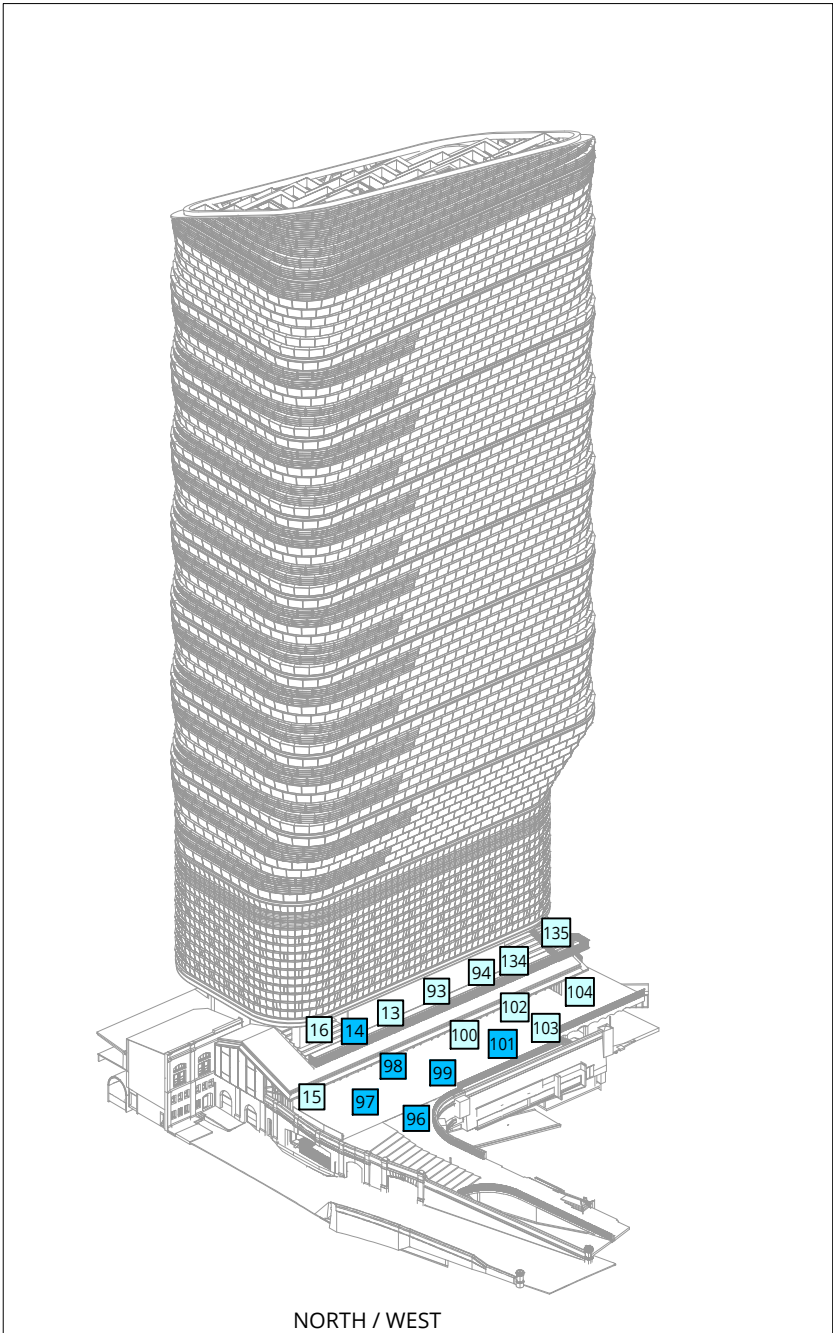
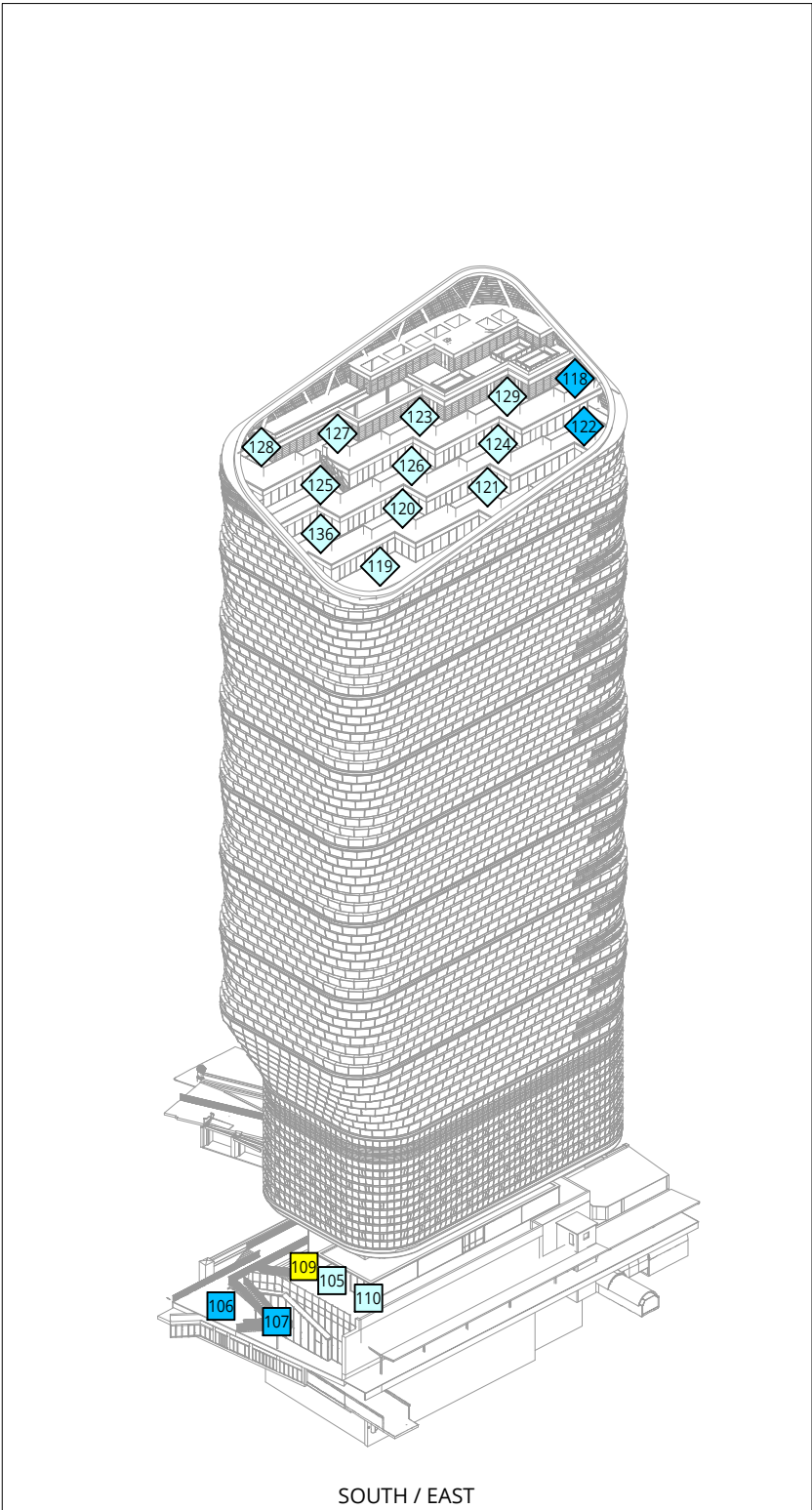
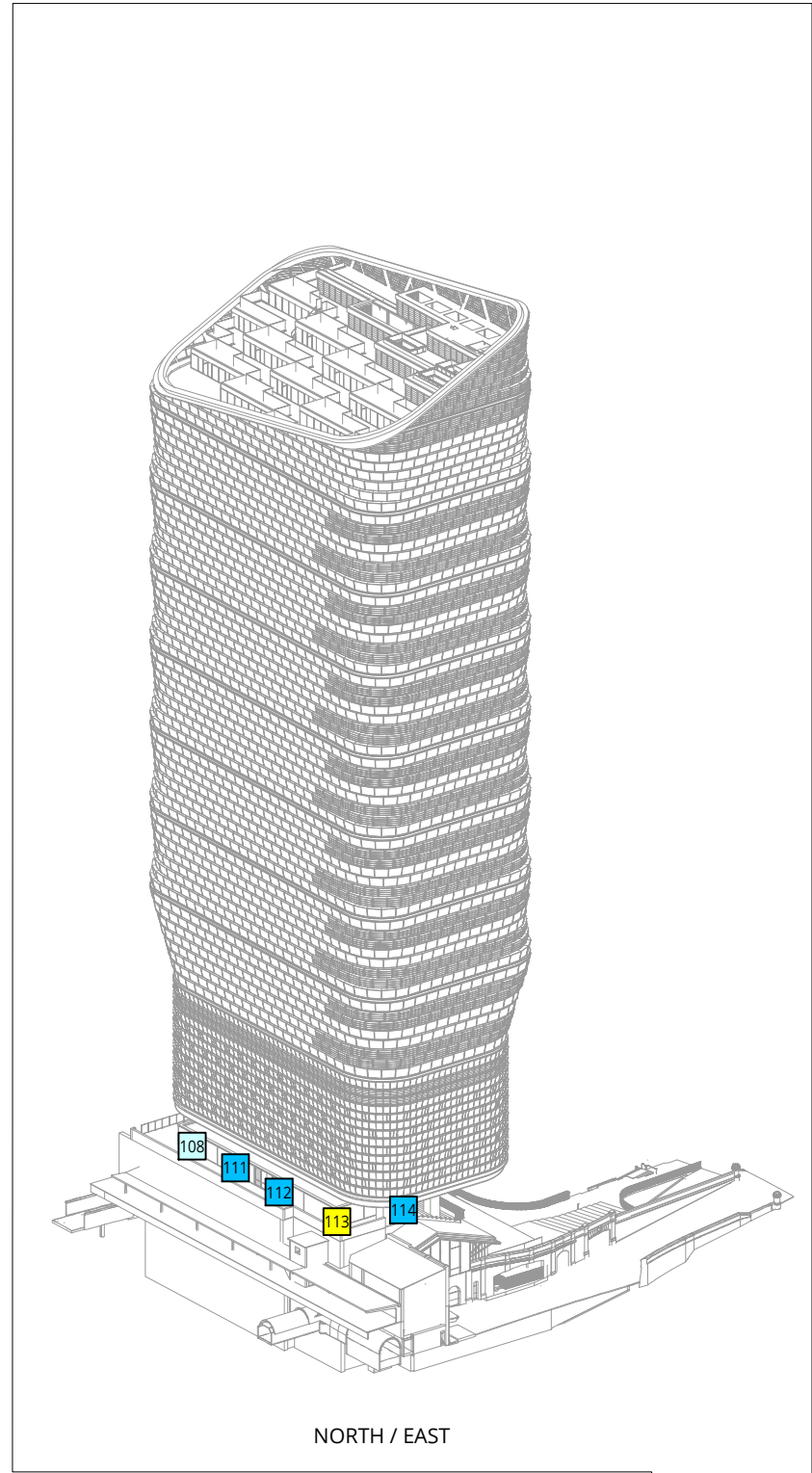
SENSOR LOCATION:

Ground Level	Circle
Podium Level	Square
Balcony/Roof Level	Diamond

Pedestrian Wind Comfort Conditions - Ground Floor
Configuration 4B: Proposed Block A, B and C Developments with Existing Surrounding Buildings, Existing and Proposed Landscaping, Wind Mitigation Measures and Solid Balustrade on Pavilion Structure
Annual
Atlassian Central - Sydney, Australia

True North ↑	Drawn by: JLF	Figure: 19	
	Approx. Scale @A3: 1:1750		
	Date Revised: Apr. 23, 2021		

Project #2100277



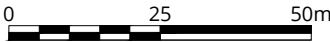
LEGEND:

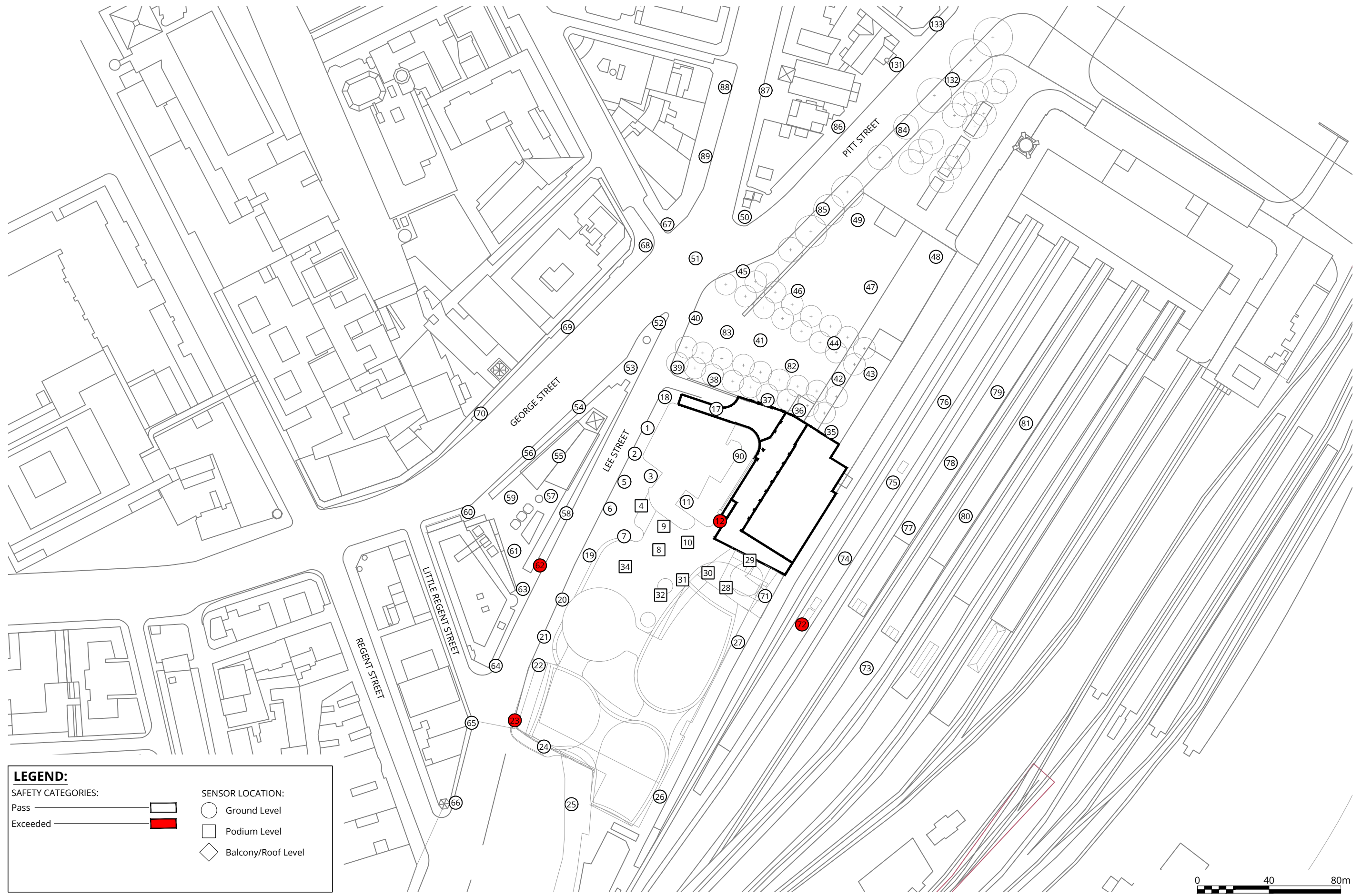
COMFORT CATEGORIES:

- Sitting —
- Standing —
- Walking —
- Uncomfortable —

SENSOR LOCATION:

- Ground Level
- Podium Level
- Balcony/Roof Level





LEGEND:

SAFETY CATEGORIES:

Pass

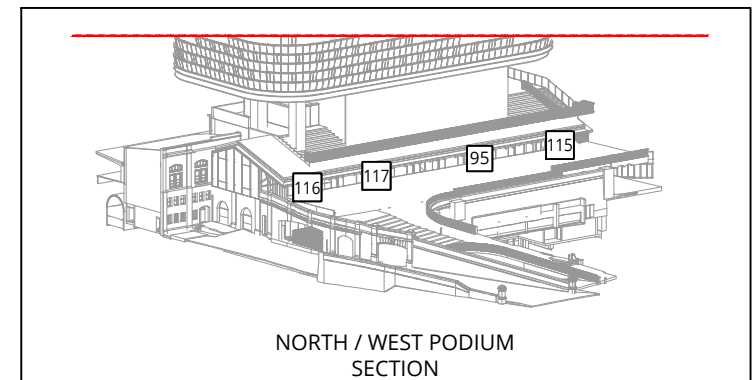
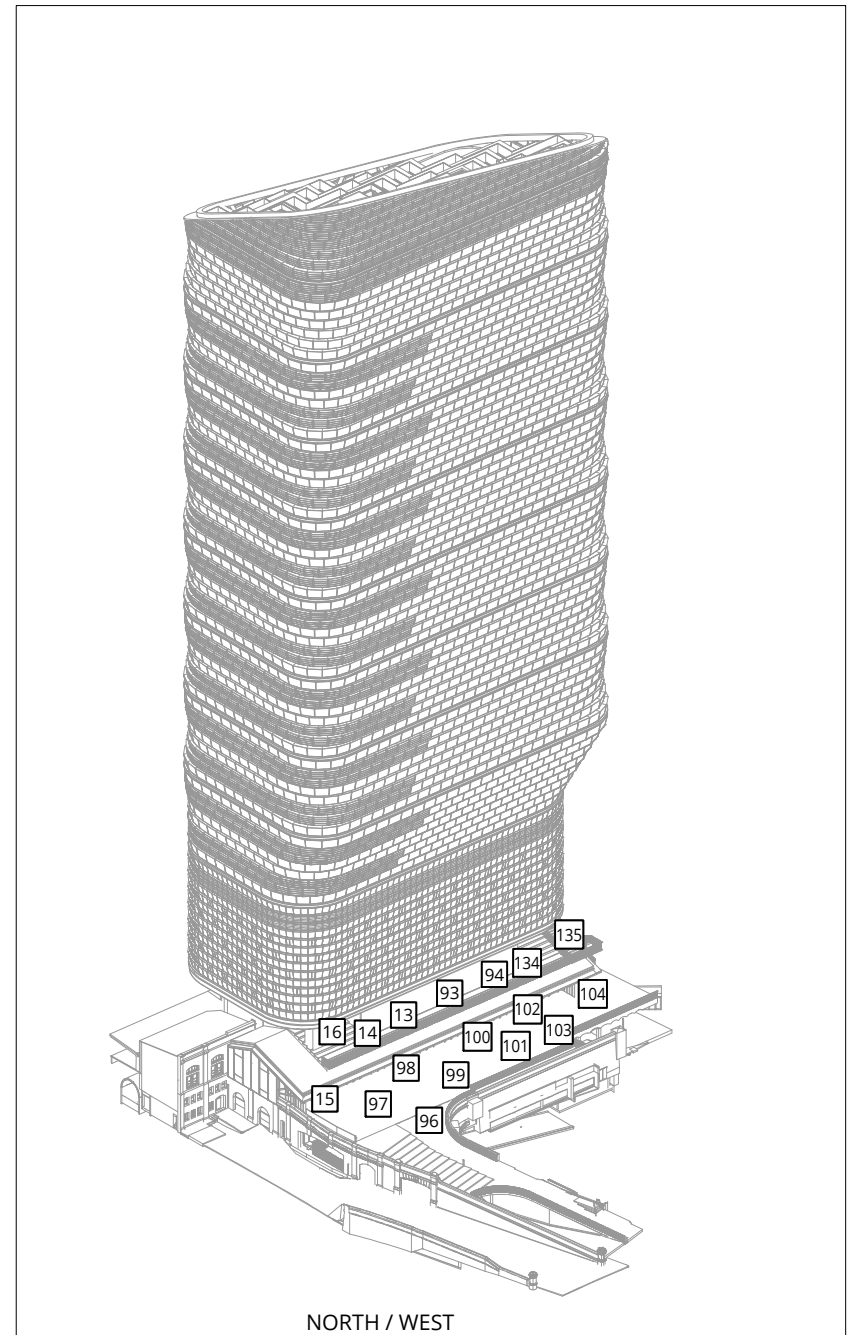
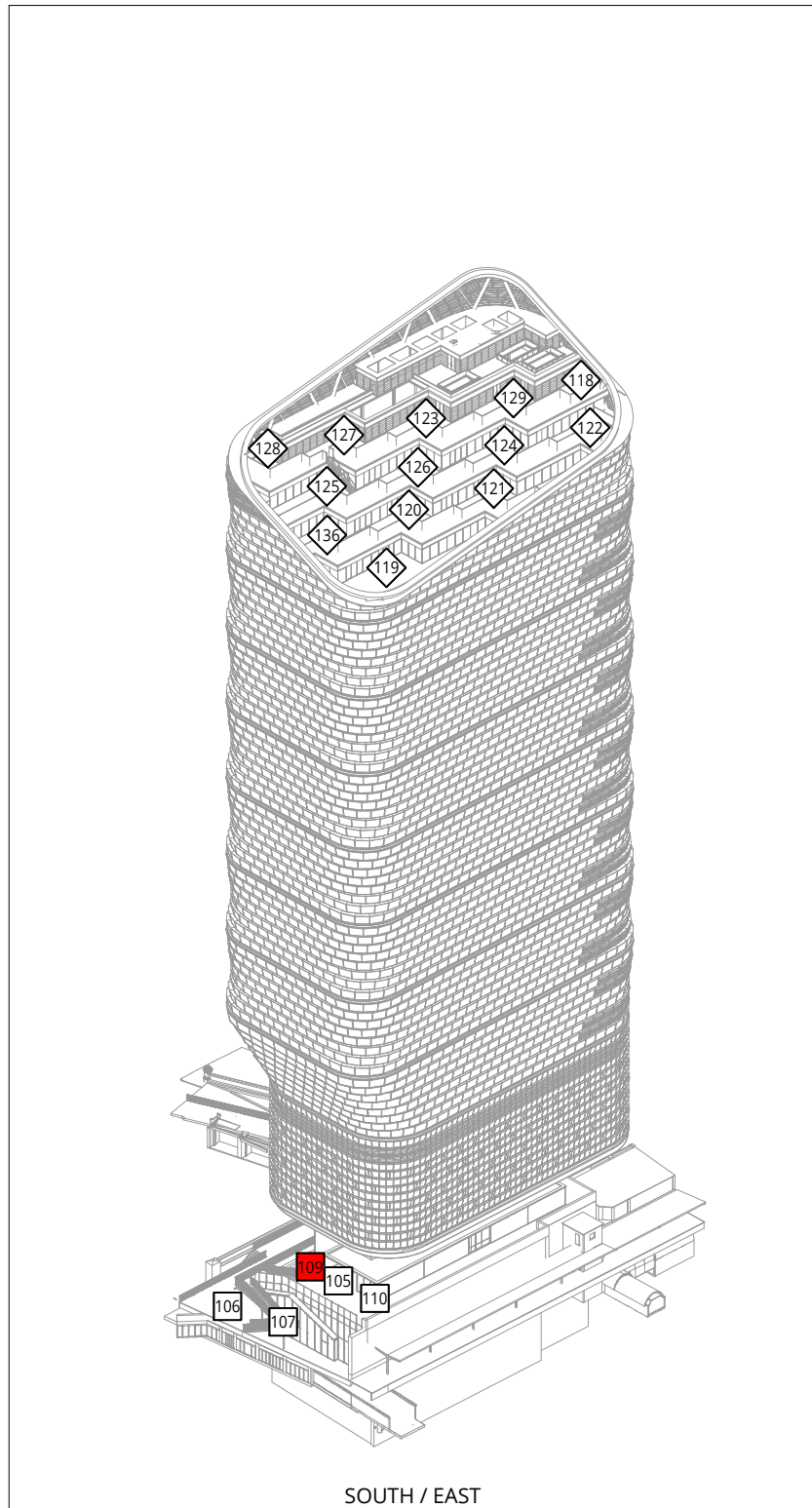
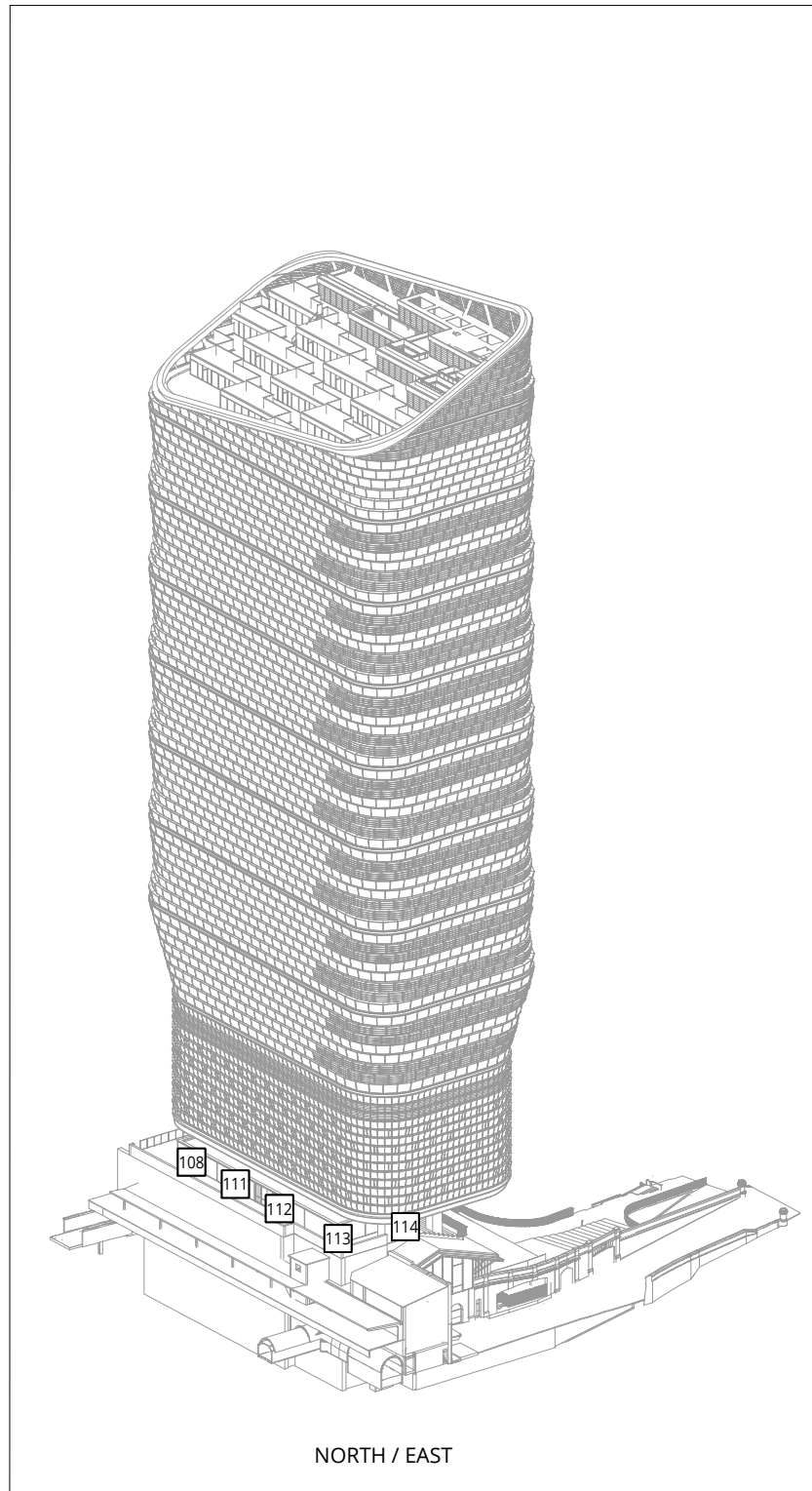
Exceeded

SENSOR LOCATION:

Ground Level


Podium Level


Balcony/Roof Level




LEGEND:


SAFETY CATEGORIES:


Pass ———— 

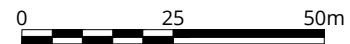
Exceeded ———— 

SENSOR LOCATION:

 Ground Level

 Podium Level

 Balcony/Roof Level



TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
1	C1	3.8	Sitting	13.6	Pass
	C2	4.5	Standing	19.8	Pass
	C3	4.5	Standing	18.1	Pass
	C4	4.5	Standing	16.1	Pass
2	C1	4.2	Standing	17	Pass
	C2	5.4	Standing	23.5	Pass
	C3	5.1	Standing	19.9	Pass
	C4	5.3	Standing	18.9	Pass
3	C1	3	Sitting	12.8	Pass
	C2	3.9	Sitting	16.6	Pass
	C3	4.2	Standing	17.7	Pass
	C4	4.9	Standing	17.8	Pass
4	C1	3.7	Sitting	15.6	Pass
	C2	3.6	Sitting	15.6	Pass
	C3	4.9	Standing	19.1	Pass
	C4	5.3	Standing	19.9	Pass
5	C1	3.6	Sitting	13.5	Pass
	C2	4.4	Standing	19.3	Pass
	C3	4.9	Standing	17.8	Pass
	C4	5.7	Standing	21.2	Pass
6	C1	3.6	Sitting	14	Pass
	C2	3.9	Sitting	14.8	Pass
	C3	5.4	Standing	21.1	Pass
	C4	5.4	Standing	19.9	Pass
7	C1	3.8	Sitting	13.8	Pass
	C2	3.3	Sitting	14.3	Pass
	C3	4.5	Standing	17.9	Pass
	C4	4.2	Standing	14.8	Pass
8	C1	3.8	Sitting	15.5	Pass
	C2	3.6	Sitting	16.4	Pass
	C3	5.6	Standing	20.2	Pass
	C4	6.1	Walking	22	Pass
9	C1	3.7	Sitting	15.1	Pass
	C2	3.9	Sitting	17.3	Pass
	C3	5.6	Standing	21	Pass
	C4	7.2	Walking	25.9	Exceeded
10	C1	3.7	Sitting	14.5	Pass
	C2	3.4	Sitting	15.7	Pass
	C3	5.1	Standing	20.1	Pass
	C4	6.7	Walking	23	Pass
11	C1	4	Sitting	16.5	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C2	4.7	Standing	20.5	Pass
	C3	5.4	Standing	20.5	Pass
	C4	4	Sitting	14.1	Pass
12	C1	-	-	-	-
	C2	4	Sitting	17.2	Pass
	C3	2.8	Sitting	16.1	Pass
	C4	7.1	Walking	24.9	Exceeded
13	C1	3.7	Sitting	14.6	Pass
	C2	4	Sitting	17.8	Pass
	C3	4.1	Standing	18.5	Pass
	C4	4.1	Standing	19.5	Pass
14	C1	3.7	Sitting	12.8	Pass
	C2	4.1	Standing	20.8	Pass
	C3	4.1	Standing	20.8	Pass
	C4	3.7	Sitting	21	Pass
15	C1	2.9	Sitting	10.9	Pass
	C2	4.9	Standing	17.1	Pass
	C3	5.1	Standing	17.4	Pass
	C4	4.2	Standing	15.9	Pass
16	C1	4.4	Standing	17	Pass
	C2	4.4	Standing	21.5	Pass
	C3	4.3	Standing	21.1	Pass
	C4	4.2	Standing	19.7	Pass
17	C1	3.3	Sitting	11.6	Pass
	C2	4.4	Standing	15.7	Pass
	C3	4.2	Standing	14.9	Pass
	C4	4.1	Standing	15.1	Pass
18	C1	5	Standing	18.8	Pass
	C2	6.2	Walking	20.1	Pass
	C3	5.8	Standing	20.1	Pass
	C4	6.2	Walking	20.3	Pass
19	C1	3.8	Sitting	13.9	Pass
	C2	4.1	Standing	15	Pass
	C3	4.8	Standing	18	Pass
	C4	4.5	Standing	17.5	Pass
20	C1	3.3	Sitting	14.1	Pass
	C2	3.6	Sitting	13.9	Pass
	C3	5.6	Standing	21.8	Pass
	C4	5.3	Standing	20.7	Pass
21	C1	3.9	Sitting	17	Pass
	C2	4	Sitting	15.3	Pass
	C3	5.6	Standing	19	Pass
	C4	5.5	Standing	18.9	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
22	C1	4.2	Standing	17.6	Pass
	C2	5	Standing	19.5	Pass
	C3	5.5	Standing	19.9	Pass
	C4	5.4	Standing	20.2	Pass
23	C1	6.9	Walking	24.3	Exceeded
	C2	6.8	Walking	23.8	Pass
	C3	8	Walking	26.9	Exceeded
	C4	7.8	Walking	26.4	Exceeded
24	C1	4.9	Standing	20.6	Pass
	C2	5.5	Standing	22.7	Pass
	C3	4.6	Standing	17	Pass
	C4	4.5	Standing	16.9	Pass
25	C1	4.1	Standing	17.6	Pass
	C2	4.4	Standing	18.4	Pass
	C3	4.9	Standing	19.7	Pass
	C4	4.9	Standing	19.6	Pass
26	C1	5.3	Standing	20.3	Pass
	C2	5.7	Standing	19.8	Pass
	C3	6.3	Walking	19.3	Pass
	C4	6.2	Walking	19.2	Pass
27	C1	4.4	Standing	16.4	Pass
	C2	4.5	Standing	15.9	Pass
	C3	4.7	Standing	17.4	Pass
	C4	4.7	Standing	17.2	Pass
28	C1	1.6	Sitting	5.9	Pass
	C2	N/A	N/A	N/A	N/A
	C3	2.2	Sitting	10.5	Pass
	C4	2.3	Sitting	9.4	Pass
29	C1	1.6	Sitting	6.1	Pass
	C2	N/A	N/A	N/A	N/A
	C3	4.9	Standing	19	Pass
	C4	4	Sitting	15.5	Pass
30	C1	1.3	Sitting	4.8	Pass
	C2	N/A	N/A	N/A	N/A
	C3	4.7	Standing	19.7	Pass
	C4	4.6	Standing	21.3	Pass
31	C1	3.7	Sitting	14.8	Pass
	C2	2.6	Sitting	9.6	Pass
	C3	4.6	Standing	18.9	Pass
	C4	4.6	Standing	17.2	Pass
32	C1	3.8	Sitting	14.7	Pass
	C2	4.4	Standing	16.5	Pass
	C3	4.5	Standing	17.6	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4	4.5	Standing	18.2	Pass
33	C1	4	Sitting	16	Pass
	C2	5.2	Standing	18	Pass
	C3	N/A	N/A	N/A	N/A
	C4	N/A	N/A	N/A	N/A
34	C1	3.2	Sitting	11.7	Pass
	C2	3.6	Sitting	13.8	Pass
	C3	5.6	Standing	20.8	Pass
	C4	5.8	Standing	21.4	Pass
35	C1	2.9	Sitting	10.6	Pass
	C2	1.9	Sitting	7.2	Pass
	C3	1.9	Sitting	7.1	Pass
	C4	2	Sitting	7.1	Pass
36	C1	2.9	Sitting	10.9	Pass
	C2	3.6	Sitting	15.8	Pass
	C3	3.5	Sitting	14.8	Pass
	C4	3.6	Sitting	12	Pass
37	C1	3.3	Sitting	11.6	Pass
	C2	4.1	Standing	15.6	Pass
	C3	3.9	Sitting	14.4	Pass
	C4	3.7	Sitting	14	Pass
38	C1	3.6	Sitting	13	Pass
	C2	5.3	Standing	20.3	Pass
	C3	4.4	Standing	17.1	Pass
	C4	4.2	Standing	14.5	Pass
39	C1	4.2	Standing	15.4	Pass
	C2	3.4	Sitting	12.2	Pass
	C3	3.6	Sitting	12.7	Pass
	C4	3.9	Sitting	13.9	Pass
40	C1	4.6	Standing	16	Pass
	C2	5.1	Standing	20.3	Pass
	C3	4.5	Standing	15.8	Pass
	C4	4.6	Standing	16.6	Pass
41	C1	3.7	Sitting	13.3	Pass
	C2	5.4	Standing	21.5	Pass
	C3	4.6	Standing	18.8	Pass
	C4	4.5	Standing	15.9	Pass
42	C1	2.4	Sitting	9.8	Pass
	C2	3.9	Sitting	19.8	Pass
	C3	4	Sitting	21.8	Pass
	C4	3.2	Sitting	14.9	Pass
43	C1	3.8	Sitting	16.5	Pass
	C2	3.1	Sitting	11.9	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
44	C3	3.4	Sitting	13.2	Pass
	C4	3.3	Sitting	11.9	Pass
	C1	3.7	Sitting	14	Pass
	C2	4.7	Standing	22.2	Pass
45	C3	4.6	Standing	24.4	Exceeded
	C4	4.1	Standing	18	Pass
	C1	4	Sitting	15.2	Pass
	C2	4.6	Standing	19	Pass
46	C3	4.1	Standing	16.2	Pass
	C4	4.2	Standing	16	Pass
	C1	4	Sitting	15.6	Pass
	C2	4.7	Standing	18	Pass
47	C3	4.4	Standing	19.9	Pass
	C4	3.9	Sitting	15.6	Pass
	C1	3.8	Sitting	15.5	Pass
	C2	4.9	Standing	19.8	Pass
48	C3	5.1	Standing	20.3	Pass
	C4	4.4	Standing	17.1	Pass
	C1	4.3	Standing	18.2	Pass
	C2	2.1	Sitting	8.4	Pass
49	C3	2.1	Sitting	8.8	Pass
	C4	1.9	Sitting	7.8	Pass
	C1	3.7	Sitting	13	Pass
	C2	4.5	Standing	19.4	Pass
50	C3	4.6	Standing	18.2	Pass
	C4	4.1	Standing	15.8	Pass
	C1	4.8	Standing	17.9	Pass
	C2	4.9	Standing	20.2	Pass
51	C3	4.4	Standing	16.6	Pass
	C4	4.4	Standing	15.6	Pass
	C1	4.9	Standing	18.3	Pass
	C2	5.5	Standing	22.8	Pass
52	C3	4.6	Standing	17.7	Pass
	C4	4.7	Standing	17.3	Pass
	C1	4.8	Standing	18	Pass
	C2	6.1	Walking	24.4	Exceeded
53	C3	4.9	Standing	18.5	Pass
	C4	5.1	Standing	19	Pass
	C1	4.5	Standing	17.5	Pass
	C2	5.9	Standing	23.4	Pass
54	C3	4.8	Standing	16.5	Pass
	C4	5.2	Standing	18.8	Pass
	C1	4.3	Standing	15.4	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C2	5.2	Standing	19.1	Pass
	C3	4.5	Standing	16.3	Pass
	C4	4.8	Standing	16.6	Pass
55	C1	4.2	Standing	18.8	Pass
	C2	4.6	Standing	17.7	Pass
	C3	4.5	Standing	16.8	Pass
	C4	4.7	Standing	18	Pass
56	C1	4.8	Standing	19	Pass
	C2	4.6	Standing	18.3	Pass
	C3	4.1	Standing	15.6	Pass
	C4	4.3	Standing	15.9	Pass
57	C1	3.5	Sitting	13	Pass
	C2	4	Sitting	16.2	Pass
	C3	4.3	Standing	16.3	Pass
	C4	4.3	Standing	16.4	Pass
58	C1	3.7	Sitting	14.9	Pass
	C2	4	Sitting	15.5	Pass
	C3	5.4	Standing	21.6	Pass
	C4	5.5	Standing	21.9	Pass
59	C1	4.5	Standing	20.7	Pass
	C2	4.6	Standing	19.4	Pass
	C3	4.5	Standing	17.4	Pass
	C4	4.3	Standing	16.7	Pass
60	C1	4.8	Standing	22	Pass
	C2	4.1	Standing	18.9	Pass
	C3	4.1	Standing	16.1	Pass
	C4	3.9	Sitting	15.3	Pass
61	C1	3.4	Sitting	12.8	Pass
	C2	3.8	Sitting	13.6	Pass
	C3	4.5	Standing	16.8	Pass
	C4	4.6	Standing	17.6	Pass
62	C1	4.8	Standing	20.2	Pass
	C2	5	Standing	19.5	Pass
	C3	6.7	Walking	25.9	Exceeded
	C4	6.4	Walking	24.7	Exceeded
63	C1	4.7	Standing	18.2	Pass
	C2	4.8	Standing	18.6	Pass
	C3	6.6	Walking	24.2	Exceeded
	C4	6.6	Walking	23.4	Pass
64	C1	6	Standing	23.6	Pass
	C2	5.9	Standing	20.7	Pass
	C3	7.4	Walking	23.6	Pass
	C4	7.3	Walking	23	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
65	C1	5.9	Standing	20.4	Pass
	C2	5.6	Standing	19	Pass
	C3	7.4	Walking	22.6	Pass
	C4	7.4	Walking	22.5	Pass
66	C1	4.6	Standing	18.8	Pass
	C2	4.3	Standing	17.4	Pass
	C3	5	Standing	17.7	Pass
	C4	4.7	Standing	17.3	Pass
67	C1	4.6	Standing	16.9	Pass
	C2	5.4	Standing	20.1	Pass
	C3	4.9	Standing	17.6	Pass
	C4	5.1	Standing	17.8	Pass
68	C1	5	Standing	18.1	Pass
	C2	5.5	Standing	20.4	Pass
	C3	4.6	Standing	16.7	Pass
	C4	4.7	Standing	16.6	Pass
69	C1	3.8	Sitting	15.8	Pass
	C2	4.2	Standing	16.4	Pass
	C3	4.4	Standing	16.8	Pass
	C4	4.4	Standing	17.4	Pass
70	C1	4	Sitting	16.5	Pass
	C2	4	Sitting	15	Pass
	C3	4.4	Standing	15.7	Pass
	C4	4.4	Standing	16.3	Pass
71	C1	4.1	Standing	16.5	Pass
	C2	3.8	Sitting	14.2	Pass
	C3	4.3	Standing	16.3	Pass
	C4	4.1	Standing	15.8	Pass
72	C1	4.3	Standing	14.9	Pass
	C2	2.9	Sitting	11.5	Pass
	C3	5	Standing	25.6	Exceeded
	C4	4.9	Standing	25.7	Exceeded
73	C1	5.1	Standing	18	Pass
	C2	4.8	Standing	17.9	Pass
	C3	5.6	Standing	21.5	Pass
	C4	5.5	Standing	20.8	Pass
74	C1	4.2	Standing	14.7	Pass
	C2	5	Standing	17.4	Pass
	C3	4.8	Standing	16.9	Pass
	C4	4.9	Standing	17.4	Pass
75	C1	4.4	Standing	15.6	Pass
	C2	5.8	Standing	23.6	Pass
	C3	5.9	Standing	22.7	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4	5.8	Standing	20.1	Pass
76	C1	4	Sitting	14.3	Pass
	C2	5.2	Standing	21.7	Pass
	C3	5.5	Standing	25	Exceeded
	C4	4.9	Standing	18.8	Pass
77	C1	4.8	Standing	16.7	Pass
	C2	5.5	Standing	19.4	Pass
	C3	5.6	Standing	18.7	Pass
	C4	5.5	Standing	18.1	Pass
78	C1	4.6	Standing	15.9	Pass
	C2	5.6	Standing	18.3	Pass
	C3	5.8	Standing	19.2	Pass
	C4	5.6	Standing	18.1	Pass
79	C1	4.4	Standing	15	Pass
	C2	5.1	Standing	17.3	Pass
	C3	5.4	Standing	19.8	Pass
	C4	5.1	Standing	17.4	Pass
80	C1	4.9	Standing	16.9	Pass
	C2	5.4	Standing	18.1	Pass
	C3	5.5	Standing	18.4	Pass
	C4	5.4	Standing	18	Pass
81	C1	4.5	Standing	15.4	Pass
	C2	4.5	Standing	14.8	Pass
	C3	4.7	Standing	15.4	Pass
	C4	4.5	Standing	14.9	Pass
82	C1	3.4	Sitting	12.1	Pass
	C2	5	Standing	22.8	Pass
	C3	4.6	Standing	21.5	Pass
	C4	4.3	Standing	15.7	Pass
83	C1	3.7	Sitting	13.2	Pass
	C2	4.9	Standing	18.2	Pass
	C3	4.6	Standing	17.4	Pass
	C4	4.8	Standing	17.3	Pass
84	C1	5.4	Standing	19.1	Pass
	C2	4	Sitting	14.4	Pass
	C3	3.8	Sitting	13.2	Pass
	C4	3.6	Sitting	12.7	Pass
85	C1	5	Standing	17.8	Pass
	C2	4.1	Standing	16.1	Pass
	C3	3.7	Sitting	15.3	Pass
	C4	3.7	Sitting	14.6	Pass
86	C1	4.7	Standing	16.9	Pass
	C2	4.3	Standing	15.2	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
87	C3	4.3	Standing	16.1	Pass
	C4	4.1	Standing	14.4	Pass
	C1	4.2	Standing	14.8	Pass
	C2	4.5	Standing	18	Pass
88	C3	3.9	Sitting	14.1	Pass
	C4	3.9	Sitting	13.9	Pass
	C1	4.9	Standing	18.9	Pass
	C2	4.9	Standing	18.4	Pass
89	C3	4.8	Standing	18.2	Pass
	C4	4.8	Standing	18.4	Pass
	C1	4.5	Standing	16.5	Pass
	C2	5	Standing	20.2	Pass
90	C3	4.3	Standing	17.3	Pass
	C4	4.5	Standing	17.6	Pass
	C1	3.4	Sitting	12	Pass
	C2	4.4	Standing	16.8	Pass
91	C3	4.2	Standing	16	Pass
	C4	6.6	Walking	21.2	Pass
	C1	N/A	N/A	N/A	N/A
	C2	N/A	N/A	N/A	N/A
92	C3	N/A	N/A	N/A	N/A
	C4	N/A	N/A	N/A	N/A
	C1	3.5	Sitting	14.9	Pass
	C2	N/A	N/A	N/A	N/A
93	C3	N/A	N/A	N/A	N/A
	C4	N/A	N/A	N/A	N/A
	C1	-	-	-	-
	C2	4.3	Standing	16.7	Pass
94	C3	4.3	Standing	18.1	Pass
	C4	4.3	Standing	18.1	Pass
	C1	-	-	-	-
	C2	4.6	Standing	17.2	Pass
95	C3	4.5	Standing	17.6	Pass
	C4	4.9	Standing	18.6	Pass
	C1	-	-	-	-
	C2	3.5	Sitting	12.8	Pass
96	C3	3.3	Sitting	14.1	Pass
	C4	4.1	Standing	17.1	Pass
	C1	-	-	-	-
	C2	4.1	Standing	19.4	Pass
97	C3	4.1	Standing	18.6	Pass
	C4	3.3	Sitting	15.4	Pass
	C1	-	-	-	-
	C2	-	-	-	-

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C2	4.4	Standing	16.1	Pass
	C3	5.3	Standing	20.2	Pass
	C4	3.9	Sitting	15.1	Pass
98	C1	-	-	-	-
	C2	4.1	Standing	15.1	Pass
	C3	4.3	Standing	18.7	Pass
	C4	4.1	Standing	18.9	Pass
99	C1	3	Sitting	10.8	Pass
	C2	4.1	Standing	14.8	Pass
	C3	4.1	Standing	14.8	Pass
	C4	3.9	Sitting	16.1	Pass
100	C1	3	Sitting	12.4	Pass
	C2	5	Standing	18	Pass
	C3	4.3	Standing	15.5	Pass
	C4	4.7	Standing	18.6	Pass
101	C1	-	-	-	-
	C2	3	Sitting	14.3	Pass
	C3	3	Sitting	14	Pass
	C4	2.6	Sitting	13.6	Pass
102	C1	-	-	-	-
	C2	5	Standing	19.2	Pass
	C3	4.3	Standing	15.2	Pass
	C4	5.5	Standing	19.6	Pass
103	C1	-	-	-	-
	C2	4.7	Standing	19.3	Pass
	C3	4.1	Standing	18.8	Pass
	C4	5.3	Standing	20.1	Pass
104	C1	-	-	-	-
	C2	4.4	Standing	19.7	Pass
	C3	4.3	Standing	19.3	Pass
	C4	4.7	Standing	19.9	Pass
105	C1	2.2	Sitting	9.4	Pass
	C2	6.2	Walking	21.7	Pass
	C3	5.2	Standing	19.1	Pass
	C4	5.1	Standing	16.7	Pass
106	C1	-	-	-	-
	C2	3.6	Sitting	15.1	Pass
	C3	4	Sitting	18.3	Pass
	C4	3.6	Sitting	16.8	Pass
107	C1	-	-	-	-
	C2	3.3	Sitting	13	Pass
	C3	3.8	Sitting	15	Pass
	C4	3.6	Sitting	14.5	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
108	C1	-	-	-	-
	C2	4.6	Standing	16.2	Pass
	C3	4.1	Standing	13.6	Pass
	C4	4	Sitting	13.3	Pass
109	C1	-	-	-	-
	C2	8.1	Uncomfortable	26.2	Exceeded
	C3	7.7	Walking	23	Pass
	C4	7.4	Walking	22.4	Pass
110	C1	-	-	-	-
	C2	5.6	Standing	20.5	Pass
	C3	5.2	Standing	18.5	Pass
	C4	5	Standing	17.5	Pass
111	C1	-	-	-	-
	C2	4.3	Standing	14.9	Pass
	C3	3.9	Sitting	13.7	Pass
	C4	3.8	Sitting	13.5	Pass
112	C1	-	-	-	-
	C2	4.2	Standing	16.4	Pass
	C3	4.3	Standing	15.8	Pass
	C4	4.1	Standing	15.4	Pass
113	C1	-	-	-	-
	C2	6.5	Walking	20.8	Pass
	C3	6.6	Walking	20.1	Pass
	C4	6.3	Walking	19.3	Pass
114	C1	-	-	-	-
	C2	3.7	Sitting	13.9	Pass
	C3	3.7	Sitting	13.6	Pass
	C4	3.6	Sitting	13.3	Pass
115	C1	2.5	Sitting	9	Pass
	C2	2.9	Sitting	12.2	Pass
	C3	2.9	Sitting	12.4	Pass
	C4	2.6	Sitting	11.6	Pass
116	C1	2.8	Sitting	10.4	Pass
	C2	2.6	Sitting	11	Pass
	C3	2.8	Sitting	11.1	Pass
	C4	2.6	Sitting	13.9	Pass
117	C1	2	Sitting	7.8	Pass
	C2	3.6	Sitting	13.4	Pass
	C3	3.6	Sitting	14.7	Pass
	C4	3.8	Sitting	15	Pass
118	C1	-	-	-	-
	C2	3.7	Sitting	13.3	Pass
	C3	3.7	Sitting	14.1	Pass
	C4	3.9	Sitting	14.6	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
119	C1	-	-	-	-
	C2	4.9	Standing	17.7	Pass
	C3	4.6	Standing	16.9	Pass
	C4	4.9	Standing	18.6	Pass
120	C1	-	-	-	-
	C2	5.1	Standing	18.6	Pass
	C3	4.7	Standing	17.7	Pass
	C4	5	Standing	18.1	Pass
121	C1	-	-	-	-
	C2	5.1	Standing	16.9	Pass
	C3	5	Standing	16.8	Pass
	C4	5	Standing	16.7	Pass
122	C1	-	-	-	-
	C2	3.4	Sitting	12.3	Pass
	C3	3.4	Sitting	12.2	Pass
	C4	3.6	Sitting	12.7	Pass
123	C1	-	-	-	-
	C2	4.6	Standing	17.3	Pass
	C3	4.3	Standing	15	Pass
	C4	4.8	Standing	17.6	Pass
124	C1	-	-	-	-
	C2	5.1	Standing	16.7	Pass
	C3	5	Standing	16.1	Pass
	C4	5.1	Standing	16.3	Pass
125	C1	-	-	-	-
	C2	4.1	Standing	14.2	Pass
	C3	4.1	Standing	14.6	Pass
	C4	4.5	Standing	16.8	Pass
126	C1	-	-	-	-
	C2	5	Standing	19.1	Pass
	C3	4.5	Standing	15.9	Pass
	C4	4.9	Standing	16.5	Pass
127	C1	-	-	-	-
	C2	4.7	Standing	16.2	Pass
	C3	4.5	Standing	15.4	Pass
	C4	4.9	Standing	16.8	Pass
128	C1	-	-	-	-
	C2	4.6	Standing	22.1	Pass
	C3	4.4	Standing	22.1	Pass
	C4	4.1	Standing	14.2	Pass
129	C1	-	-	-	-
	C2	4.2	Standing	14.3	Pass
	C3	4.2	Standing	13.8	Pass
	C4	4.2	Standing	13.7	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
130	C1	N/A	N/A	N/A	N/A
	C2	N/A	N/A	N/A	N/A
	C3	N/A	N/A	N/A	N/A
	C4	N/A	N/A	N/A	N/A
131	C1	N/A	N/A	N/A	N/A
	C2	4.9	Standing	16.4	Pass
	C3	5.1	Standing	18	Pass
	C4	4.9	Standing	16.2	Pass
132	C1	N/A	N/A	N/A	N/A
	C2	4.7	Standing	16.9	Pass
	C3	4.7	Standing	16.9	Pass
	C4	4.6	Standing	16.7	Pass
133	C1	N/A	N/A	N/A	N/A
	C2	4.6	Standing	16.5	Pass
	C3	4.5	Standing	16.4	Pass
	C4	4.4	Standing	16.1	Pass
134	C1	-	-	-	-
	C2	5.1	Standing	20.2	Pass
	C3	4.5	Standing	17.5	Pass
	C4	5	Standing	17.9	Pass
135	C1	-	-	-	-
	C2	4.4	Standing	17.2	Pass
	C3	5	Standing	17.3	Pass
	C4	4.6	Standing	16.5	Pass
136	C1	-	-	-	-
	C2	5.4	Standing	16.5	Pass
	C3	5.1	Standing	17	Pass
	C4	5.3	Standing	17.7	Pass

**Table 2: Pedestrian Wind Comfort and Safety Conditions for Configuration 4A and 4B
Alternative Pavilion Designs**

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
1	C4A	4.5	Standing	16.7	Pass
	C4B	4.6	Standing	17	Pass
2	C4A	5.1	Standing	18.9	Pass
	C4B	5.1	Standing	18.7	Pass
3	C4A	4.7	Standing	17.3	Pass
	C4B	4.3	Standing	15.5	Pass
4	C4A	5	Standing	17.8	Pass
	C4B	4.8	Standing	17.3	Pass
5	C4A	5	Standing	17.4	Pass
	C4B	4.8	Standing	17.1	Pass
6	C4A	5.1	Standing	19.5	Pass
	C4B	5.1	Standing	19.2	Pass
7	C4A	4.2	Standing	14.7	Pass
	C4B	4.2	Standing	15.4	Pass
8	C4A	5.6	Standing	21.2	Pass
	C4B	5.2	Standing	20.7	Pass
9	C4A	5.7	Standing	19.8	Pass
	C4B	5.2	Standing	18.6	Pass
10	C4A	6.5	Walking	22.1	Pass
	C4B	5.9	Standing	21.2	Pass
11	C4A	4.2	Standing	14.7	Pass
	C4B	4.3	Standing	15.2	Pass
12	C4A	7.1	Walking	24.1	Exceeded
	C4B	7.1	Walking	24	Exceeded
13	C4A	4.1	Standing	18.6	Pass
	C4B	4.1	Standing	18.8	Pass
14	C4A	3.6	Sitting	21.3	Pass
	C4B	3.8	Sitting	21.3	Pass
15	C4A	4.3	Standing	15.6	Pass
	C4B	4.2	Standing	15.7	Pass
16	C4A	4.1	Standing	19.8	Pass
	C4B	4.2	Standing	19.6	Pass
17	C4A	4	Sitting	14.7	Pass
	C4B	4.1	Standing	15.4	Pass
18	C4A	6.3	Walking	20.1	Pass
	C4B	6.3	Walking	20.1	Pass
19	C4A	4.5	Standing	17.4	Pass
	C4B	4.5	Standing	17.2	Pass
20	C4A	5.3	Standing	20.8	Pass
	C4B	5.3	Standing	20.9	Pass
21	C4A	5.6	Standing	19.1	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4B	5.7	Standing	19.3	Pass
22	C4A	5.4	Standing	20.1	Pass
	C4B	5.6	Standing	19.9	Pass
23	C4A	7.9	Walking	26.6	Exceeded
	C4B	7.8	Walking	26.5	Exceeded
24	C4A	4.5	Standing	16.4	Pass
	C4B	4.5	Standing	16.4	Pass
25	C4A	4.8	Standing	19.8	Pass
	C4B	4.8	Standing	19.2	Pass
26	C4A	6.2	Walking	18.9	Pass
	C4B	6.2	Walking	19.1	Pass
27	C4A	4.7	Standing	17.5	Pass
	C4B	4.5	Standing	17.4	Pass
28	C4A	2.8	Sitting	10	Pass
	C4B	2.4	Sitting	10	Pass
29	C4A	3.4	Sitting	14.1	Pass
	C4B	3.5	Sitting	15.4	Pass
30	C4A	5.1	Standing	20.8	Pass
	C4B	5.1	Standing	20.5	Pass
31	C4A	4.7	Standing	17.5	Pass
	C4B	4.9	Standing	18	Pass
32	C4A	4.6	Standing	17.2	Pass
	C4B	4.5	Standing	17.5	Pass
33	C4A	N/A	N/A	N/A	N/A
	C4B	N/A	N/A	N/A	N/A
34	C4A	5.3	Standing	20.6	Pass
	C4B	5.2	Standing	20.7	Pass
35	C4A	1.9	Sitting	7.3	Pass
	C4B	1.9	Sitting	7.1	Pass
36	C4A	3.6	Sitting	12.3	Pass
	C4B	3.6	Sitting	12.4	Pass
37	C4A	3.7	Sitting	13.6	Pass
	C4B	3.7	Sitting	13.8	Pass
38	C4A	4.1	Standing	14.3	Pass
	C4B	4.2	Standing	15.3	Pass
39	C4A	3.9	Sitting	13.8	Pass
	C4B	4	Sitting	14	Pass
40	C4A	4.7	Standing	16.5	Pass
	C4B	4.7	Standing	17.1	Pass
41	C4A	4.5	Standing	15.7	Pass
	C4B	4.5	Standing	15.8	Pass
42	C4A	3.2	Sitting	14.9	Pass
	C4B	3.3	Sitting	15	Pass
43	C4A	3.2	Sitting	11.9	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4B	3.3	Sitting	11.7	Pass
44	C4A	4	Sitting	17.9	Pass
	C4B	4.1	Standing	18.1	Pass
45	C4A	4.1	Standing	16.1	Pass
	C4B	4.2	Standing	16.3	Pass
46	C4A	3.9	Sitting	15.5	Pass
	C4B	4	Sitting	15.2	Pass
47	C4A	4.4	Standing	16.9	Pass
	C4B	4.4	Standing	17.3	Pass
48	C4A	2	Sitting	8.2	Pass
	C4B	2	Sitting	8.2	Pass
49	C4A	4	Sitting	15.3	Pass
	C4B	4	Sitting	15.6	Pass
50	C4A	4.3	Standing	15.9	Pass
	C4B	4.4	Standing	15.7	Pass
51	C4A	4.6	Standing	16.9	Pass
	C4B	4.7	Standing	17.6	Pass
52	C4A	5	Standing	18.7	Pass
	C4B	5.2	Standing	19.3	Pass
53	C4A	5.3	Standing	18.9	Pass
	C4B	5.4	Standing	19.4	Pass
54	C4A	4.8	Standing	16.8	Pass
	C4B	4.9	Standing	16.9	Pass
55	C4A	4.5	Standing	17.5	Pass
	C4B	4.5	Standing	17.8	Pass
56	C4A	4.3	Standing	15.6	Pass
	C4B	4.4	Standing	15.8	Pass
57	C4A	4.3	Standing	17	Pass
	C4B	4.2	Standing	16.6	Pass
58	C4A	5.4	Standing	22.2	Pass
	C4B	5.4	Standing	21.9	Pass
59	C4A	4.3	Standing	17	Pass
	C4B	4.3	Standing	16.8	Pass
60	C4A	3.9	Sitting	15.4	Pass
	C4B	3.9	Sitting	15.4	Pass
61	C4A	4.7	Standing	17.8	Pass
	C4B	4.7	Standing	17.8	Pass
62	C4A	6.4	Walking	25.2	Exceeded
	C4B	6.5	Walking	25.4	Exceeded
63	C4A	6.2	Walking	23.7	Pass
	C4B	6.3	Walking	23.9	Pass
64	C4A	7.3	Walking	22.8	Pass
	C4B	7.3	Walking	22.8	Pass
65	C4A	7.3	Walking	22.7	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4B	7.3	Walking	22.5	Pass
66	C4A	4.7	Standing	17.3	Pass
	C4B	4.6	Standing	17.3	Pass
67	C4A	5	Standing	17.7	Pass
	C4B	5	Standing	17.6	Pass
68	C4A	4.6	Standing	16.1	Pass
	C4B	4.6	Standing	16.1	Pass
69	C4A	4.4	Standing	17.4	Pass
	C4B	4.6	Standing	17.6	Pass
70	C4A	4.4	Standing	16	Pass
	C4B	4.5	Standing	16.1	Pass
71	C4A	4.1	Standing	15.7	Pass
	C4B	4.1	Standing	15.7	Pass
72	C4A	5.3	Standing	27.2	Exceeded
	C4B	4.9	Standing	26	Exceeded
73	C4A	5.5	Standing	20.9	Pass
	C4B	5.5	Standing	20.9	Pass
74	C4A	4.8	Standing	17.1	Pass
	C4B	4.8	Standing	16.9	Pass
75	C4A	5.8	Standing	19.7	Pass
	C4B	5.8	Standing	20	Pass
76	C4A	4.9	Standing	18.8	Pass
	C4B	5	Standing	19.2	Pass
77	C4A	5.5	Standing	17.9	Pass
	C4B	5.6	Standing	17.8	Pass
78	C4A	5.6	Standing	18.1	Pass
	C4B	5.6	Standing	18.2	Pass
79	C4A	5.1	Standing	17.4	Pass
	C4B	5.1	Standing	17.6	Pass
80	C4A	5.4	Standing	18.1	Pass
	C4B	5.5	Standing	17.9	Pass
81	C4A	4.5	Standing	15	Pass
	C4B	4.5	Standing	15.1	Pass
82	C4A	4.2	Standing	15.5	Pass
	C4B	4.3	Standing	15.7	Pass
83	C4A	4.9	Standing	17.2	Pass
	C4B	4.9	Standing	17.5	Pass
84	C4A	3.6	Sitting	12.4	Pass
	C4B	3.6	Sitting	12.6	Pass
85	C4A	3.6	Sitting	14.6	Pass
	C4B	3.6	Sitting	14.6	Pass
86	C4A	4	Sitting	14.3	Pass
	C4B	4.1	Standing	14.3	Pass
87	C4A	3.8	Sitting	14	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4B	3.8	Sitting	14.3	Pass
88	C4A	4.7	Standing	18	Pass
	C4B	4.8	Standing	18.4	Pass
89	C4A	4.4	Standing	17.3	Pass
	C4B	4.4	Standing	16.8	Pass
90	C4A	6.7	Walking	21	Pass
	C4B	6.4	Walking	20.8	Pass
91	C4A	5.2	Standing	16.4	Pass
	C4B	5.1	Standing	18	Pass
92	C4A	N/A	N/A	N/A	N/A
	C4B	N/A	N/A	N/A	N/A
93	C4A	4.3	Standing	18	Pass
	C4B	4.4	Standing	18.8	Pass
94	C4A	4.8	Standing	18	Pass
	C4B	5	Standing	19.4	Pass
95	C4A	3.7	Sitting	17	Pass
	C4B	3.7	Sitting	17.4	Pass
96	C4A	3.3	Sitting	15.7	Pass
	C4B	3.3	Sitting	15.9	Pass
97	C4A	3.9	Sitting	15.3	Pass
	C4B	3.9	Sitting	15.2	Pass
98	C4A	4.1	Standing	19.4	Pass
	C4B	4	Sitting	19.8	Pass
99	C4A	3.9	Sitting	16.2	Pass
	C4B	3.9	Sitting	16.1	Pass
100	C4A	4.7	Standing	18.6	Pass
	C4B	4.8	Standing	18.9	Pass
101	C4A	2.6	Sitting	13	Pass
	C4B	2.6	Sitting	13.2	Pass
102	C4A	4.8	Standing	17.9	Pass
	C4B	4.9	Standing	18.3	Pass
103	C4A	4.7	Standing	17.8	Pass
	C4B	4.5	Standing	17.5	Pass
104	C4A	4.6	Standing	19.7	Pass
	C4B	4.8	Standing	20.2	Pass
105	C4A	5.1	Standing	18	Pass
	C4B	5.2	Standing	17.7	Pass
106	C4A	3.7	Sitting	16.6	Pass
	C4B	3.7	Sitting	16.6	Pass
107	C4A	3.7	Sitting	15.4	Pass
	C4B	3.2	Sitting	11.2	Pass
108	C4A	3.9	Sitting	13.2	Pass
	C4B	4.1	Standing	13.7	Pass
109	C4A	7.2	Walking	22.1	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4B	7.6	Walking	24	Exceeded
110	C4A	5.1	Standing	18.2	Pass
	C4B	5.1	Standing	17.8	Pass
111	C4A	3.8	Sitting	13.6	Pass
	C4B	3.9	Sitting	14	Pass
112	C4A	4.1	Standing	15.5	Pass
	C4B	4	Sitting	15.5	Pass
113	C4A	6.3	Walking	19.4	Pass
	C4B	6.3	Walking	19.3	Pass
114	C4A	3.6	Sitting	13	Pass
	C4B	3.6	Sitting	13.2	Pass
115	C4A	2.6	Sitting	11.8	Pass
	C4B	2.6	Sitting	12	Pass
116	C4A	2.5	Sitting	14	Pass
	C4B	2.6	Sitting	14.1	Pass
117	C4A	3.7	Sitting	15.1	Pass
	C4B	3.7	Sitting	15.6	Pass
118	C4A	3.8	Sitting	14.6	Pass
	C4B	3.8	Sitting	14.4	Pass
119	C4A	4.8	Standing	18	Pass
	C4B	4.8	Standing	18	Pass
120	C4A	5	Standing	18.1	Pass
	C4B	5	Standing	18	Pass
121	C4A	5.1	Standing	16.6	Pass
	C4B	5	Standing	16.7	Pass
122	C4A	3.6	Sitting	12.8	Pass
	C4B	3.6	Sitting	12.7	Pass
123	C4A	4.8	Standing	17.4	Pass
	C4B	4.8	Standing	17.6	Pass
124	C4A	5.1	Standing	16.2	Pass
	C4B	5.1	Standing	16.2	Pass
125	C4A	4.4	Standing	16.7	Pass
	C4B	4.4	Standing	16.9	Pass
126	C4A	4.8	Standing	16.8	Pass
	C4B	4.8	Standing	16.7	Pass
127	C4A	4.8	Standing	16.5	Pass
	C4B	4.8	Standing	16.5	Pass
128	C4A	4.1	Standing	14.6	Pass
	C4B	4.1	Standing	14.6	Pass
129	C4A	4.1	Standing	13.9	Pass
	C4B	4.1	Standing	13.9	Pass
130	C4A	N/A	N/A	N/A	N/A
	C4B	N/A	N/A	N/A	N/A
131	C4A	4.8	Standing	16	Pass

Location	Configuration	Wind Comfort		Wind Safety	
		Speed (m/s)	Rating	Speed (m/s)	Rating
	C4B	4.8	Standing	16	Pass
132	C4A	4.4	Standing	16.2	Pass
	C4B	4.4	Standing	16.4	Pass
133	C4A	4.4	Standing	16.5	Pass
	C4B	4.5	Standing	16.4	Pass
134	C4A	4.9	Standing	17.6	Pass
	C4B	5	Standing	17.9	Pass
135	C4A	4.6	Standing	17.8	Pass
	C4B	5.3	Standing	21.1	Pass
136	C4A	4.4	Standing	15.3	Pass
	C4B	4.4	Standing	15.4	Pass