

Final Report Revision 3



Wind Tunnel Tests for:

SICEEP

Sydney, Australia

CPP Project 6949

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EXECUTIVE SUMMARY

Cermak Peterka Petersen Pty. Ltd. has been engaged by Darling Harbour Live to assess the proposed Sydney International Convention Centre, Exhibition and Entertainment Precinct (SICEEP) in terms of Wind Impact. This report supports a State Significant Development Application (SSD 12_5752). The report addresses the Director-General's Requirements for an assessment of the impact of the development on the amenity of the wind environment of the site by providing a Site Wide Wind Report for SSDA1, SSDA2 and SSDA6 as well as a Development Specific Wind Report for SSDA1. To achieve this, this report investigates wind impacts for Public Private Partnership (PPP) component of the SICEEP development at the existing site, as well as the whole SICEEP Preferred Masterplan including planned future precincts. Development Specific Wind Reports incorporating wind tunnel testing will later be prepared for SSDA3, SSDA4, SSDA5 and SSDA 6 to meet the DGR requirements for Development Specific Wind Reports.

This report also makes reference to City of Sydney, (2004), "Central Sydney Development Control Plan 1996" and City of Sydney (2012), "Sydney Development Control Plan 2012, Section 3 General Provisions".

A model of the full SICEEP project site, with replicas of surrounding buildings within a 570 m radius, was constructed to a 1:400 scale and centred on a turntable in the wind tunnel. A wind tunnel study was conducted as part of the Development Specific assessment, and two configurations were tested: Configuration A being the International Convention Centre (ICC), the ICC Exhibition Centre, and The Theatre with the existing surrounds (Figure 7) and Configuration B with the proposed ICC Hotel and The Haymarket precinct to the south of the development (Figure 8). A qualitative assessment has also been provided for the wind conditions around the ICC Hotel and Haymarket sites, with wind tunnel studies to follow during the development application process for each of these areas.

The wind tunnel testing was performed in the natural boundary layer wind tunnel of Cermak Peterka Petersen Pty. Ltd., St. Peters. Measurements of winds likely to be experienced by pedestrians were made with a hot-film anemometer at 53 locations in each configuration for 16 wind directions each. These points were tested in the proposed configuration. The measurements were combined with wind statistics to produce results of wind speed versus the percentage of time that wind speed is exceeded for each location.

The street level wind environment at most locations has been found to be similar to, or calmer than, typical street level wind conditions in the surrounding areas. Most locations in

the public domain were found to pass the distress criterion and the few points not meeting this level were rated suitable for able bodied patrons only.

In Configuration A, Location 46 is rated as suited only to abled bodied patrons (Figure 10). Winds at this location can be ameliorated during detailed design. In Configuration B, Locations 2.1 and 3.1 are rated as acceptable for able bodied patrons only (Figure 11), and Location 3.1 rated as only suitable for business walking. This was due to the overall massing of both the ICC building and the ICC Hotel building, but also the additional influence of the Hotel's shape. Winds at these locations can be treated during the development of the final form of the Hotel. Location 11.1, at an elevated pedestrian walkway adjacent to the M4 road deck, was also rated as suited only for business walking and to able bodied pedestrians, and can be treated during detailed design through the use of local vertical screens. Locations 51.1 and 52.1 were also rated only for able bodied patrons only. Location 52.1 was only rated as suitable for business walking. However, it is expected that the winds at location 51.1 and 52.1 can be treated during the development of the design for the Haymarket precinct.

In terms of wind comfort, most locations throughout the development achieve Lawson wind comfort ratings suitable for intended outdoor recreational activities as discussed in the body of the report. The event deck was found to be suited for pedestrian standing activities in both configurations examined, and from a wind perspective is well suited to informal gatherings and functions. In general, the conditions around the proposed development are considered to be relatively calm, particularly for an inner city location. It is noted that while several locations are rated as suited to casual outdoor sitting activities, no locations met the more rigorous formal outdoor dining threshold, but this is rarely met in Sydney CBD locations. Localised screening is recommended for any locations planned for long term stationary activities such as alfresco and café dining for optimal wind amenity.

Quantitative wind tunnel results have been used to assist in the qualitative prediction of the wind conditions around the ICC Hotel, and in the Haymarket precinct. Windy conditions are expected around the base of tall buildings without a podium. It is understood the design of the ICC Hotel and Haymarket precinct buildings are not finalised.

The strength of the conditions in windy locations will depend on the final architectural form of the towers and other structures of the ICC Hotel and Haymarket precinct buildings, and can be confirmed using wind tunnel tests at later stages of the design. Detailed serviceability issues associated with landscaping, outdoor cafes, door placement, internal pressure issues etc. will be considered during further design development and will require wind tunnel testing for verification. A mitigation strategy can be developed with the design

team during development of the Haymarket and ICC Hotel building forms. Mitigation strategies such as awnings, fins, or landscaping would be developed during detailed design.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
TABLE OF CONTENTS.....	v
LIST OF FIGURES.....	v
LIST OF TABLES	vi
LIST OF SYMBOLS.....	vii
1. INTRODUCTION.....	1
1.1. Wind Tunnel Testing Approach	1
2. CLIENT PROVIDED PROJECT INFORMATION.....	3
2.1. Introduction	3
2.2. Overview of Proposed Development	3
2.3. Background	4
2.4. Site Description	5
2.5. Planning Approvals Strategy	6
3. THE WIND TUNNEL TEST	8
4. ENVIRONMENTAL WIND CRITERIA	11
5. DATA ACQUISITION AND RESULTS – WIND TUNNEL TESTS FOR DEVELOPMENT SPECIFIC PPP COMPONENT.....	12
5.1. Velocities.....	12
5.1.1. <i>Velocity Profiles</i>	12
5.1.2. <i>Pedestrian Winds</i>	12
6. DISCUSSION - WIND TUNNEL TESTS FOR DEVELOPMENT SPECIFIC PPP COMPONENT.....	19
6.1. Configuration A Results.....	19
6.2. Configuration B Results	23
7. QUALITATIVE ASSESSMENT: SITE WIDE	25
7.1. The ICC Hotel	25
7.2. The Haymarket Precinct.....	26
8. CONCLUSIONS.....	29
8.1. Wind Tunnel Study of Development Specific PPP Components	29
8.2. Qualitative Assessment Site Wide.....	29
9. REFERENCES	31
Appendix 1: Additional Photographs of the CPP Wind Tunnel Model.....	32
Appendix 2: Directional Wind Results for Configuration A	33
Appendix 3: Directional Wind Results for Configuration B	47

LIST OF FIGURES

Figure 1: The SICEEP development site	6
Figure 2: Preferred Master Plan for the SICEEP development	7
Figure 3: Schematic of the closed circuit wind tunnel.....	8
Figure 4: Mean velocity and turbulence profiles approaching the model.....	9
Figure 5: Photograph of Configuration A in the CPP wind tunnel	10
Figure 6: Photograph of Configuration B in the CPP wind tunnel.....	10
Figure 7: Extent of model for Configuration A.....	13
Figure 8: Extent of model for Configuration B.....	14
Figure 9: Wind rose of direction and speed for Sydney Airport	15
Figure 10: Pedestrian wind speed measurement locations with ratings for Configuration A	17
Figure 11: Pedestrian wind speed measurement locations with ratings for Configuration B	18
Figure 12: Architectural impression of the proposed SICEEP Project site viewed from the east.....	26
Figure 13: East elevation of the ICC and ICC Hotel	26
Figure 14: Maximum height envelope of the Haymarket precinct.....	27

Figure 15: Perspective view of the maximum building envelope of The Haymarket precinct, viewed from the north.....	27
Figure 16: Configuration A, viewed from the east.....	32
Figure 17: Configuration B, viewed from the south.....	32

LIST OF TABLES

Table 1: Configurations for data acquisition.....	2
Table 2: Summary of Lawson criteria	11
Table 3: Summary of wind effects on people, Penwarden (1973)	16

LIST OF SYMBOLS

D	Characteristic dimension (building height, width, etc.)
n	Mean velocity profile power law exponent
T_u	Turbulence intensity, U_{rms}/U
U	Local mean velocity
U_{ref}	Reference velocity at reference height z_{ref}
U_{pk}	Peak wind speed in pedestrian studies
U_{rms}	Root-mean-square of fluctuating velocity
z	Height above surface
ν	Kinematic viscosity of approach flow
$\sigma(\)$	Standard deviation of $(\)$, $=(\)'_{\text{rms}}$
ρ	Density of approach flow
$(\)_{\text{max}}$	Maximum value during data record
$(\)_{\text{min}}$	Minimum value during data record
$(\)_{\text{mean}}$	Mean value during data record
$(\)_{\text{rms}}$	Root mean square about the mean

1. INTRODUCTION

Cermak Peterka Petersen Pty. Ltd. has been engaged by Darling Harbour Live to assess the proposed Sydney International Convention Centre, Exhibition and Entertainment Precinct (SICEEP) Public Private Partnership (PPP) component in terms of Wind Impact. This report supports a State Significant Development Application (SSD 12_5752) submitted to the Minister for Planning and Infrastructure pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The report addresses the Director-General's Requirements for an assessment of the impact of the development on the amenity of the wind environment of the site by providing a Site Wide Wind Report for SSDA1, SSDA2 and SSDA6 as well as a Development Specific Wind Report for SSDA1. To achieve this, this report investigates wind impacts for Public Private Partnership (PPP) component of the SICEEP development at the existing site, as well as the whole SICEEP Preferred Masterplan including planned future precincts. Development Specific Wind Reports incorporating wind tunnel testing will later be prepared for SSDA3, SSDA4, SSDA5 and SSDA 6 to meet the DGR requirements for Development Specific Wind Reports.

This report makes reference to City of Sydney, (2004), "Central Sydney Development Control Plan 1996" and City of Sydney (2012), "Sydney Development Control Plan 2012, Section 3 General Provisions". Wind impact is assessed through a series of wind tunnel tests of two precinct configurations, firstly for the proposed PPP developments with existing surrounding developments at the site and secondly proposed PPP developments with indicative building massing of the Haymarket and ICC Hotel precincts.

1.1. Wind Tunnel Testing Approach

Pedestrian acceptability of footpaths, entrances, plazas, and terraces in terms of wind impact is often an important design parameter of interest to the building owner and architect. Assessment of the acceptability of the pedestrian level wind environment is desirable during the project design phase so that modifications can be made, if necessary, to create wind conditions suitable for the intended use of the space.

Analytical methods such as computational fluid dynamics (CFD) are not capable, except in very simple geometries, of estimating wind pressures, frame loads, or windiness in pedestrian areas.

Techniques have been developed which permit boundary layer wind tunnel modelling of buildings to determine wind velocities in pedestrian areas. This report includes wind tunnel test procedures, test results, and a discussion of test results obtained. Table 1 summarizes the model configurations, test methods, and data acquisition parameters. All data collection was performed in

accordance with Australasian Wind Engineering Society (2001), and American Society of Civil Engineers (1999, 2010).

Table 1: Configurations for data acquisition

<i>General Information</i>	
Model scale	1:400
Surrounding model radius (full-scale)	570 m
Reference height (full-scale)	200 m
Approach Terrain Category	Terrain Category 3
<i>Testing Configuration(s)</i>	
Configuration A	<p>Proposed SICEEP development with surrounding buildings and landscape including existing buildings on the ICC Hotel and Haymarket sites, as shown in Figure 7.</p> <p>Pedestrian winds measured at 53 locations for 16 wind directions in 22.5° increments from 0° (north)</p>
Configuration B	<p>Proposed SICEEP development with surrounding buildings and landscape including proposed buildings on the ICC Hotel and Haymarket sites, as shown in Figure 8.</p> <p>Pedestrian winds measured at 53 locations for 16 wind directions in 22.5° increments from 0° (north)</p>

2. CLIENT PROVIDED PROJECT INFORMATION

2.1. Introduction

The SICEEP Project will deliver Australia's global city with world class convention, exhibition and entertainment facilities that can compete effectively in the national and international events markets. The SICEEP Project importantly forms a critical element of the NSW Government's aspiration to "make NSW number one again". The SICEEP Project also involves the creation of a new neighbourhood and a community hub.

2.2. Overview of Proposed Development

The proposed development involves construction of the PPP component of the SICEEP Project, comprising new, integrated and world-class convention, exhibition and entertainment facilities with associated retail and public domain upgrades.

The application more specifically seeks approval for the following development:

- Demolition of existing improvements on the site, including existing Sydney Convention Centre (part) and Sydney Exhibition Centre;
- Associated tree removal and replanting;
- Construction of a new, integrated and world-class Convention, Exhibition and Entertainment Centre;
- Public domain improvements, including:
 - reinvigorating and expanding Tumbalong Park;
 - provision (part) of a new active north-south pedestrian connection (known as the Boulevard);
 - provision of new east-west connections, including Harbourside Place and Tumbalong Place;
 - Provision of a pedestrian bridge link from Quarry Street;
 - Retention of the tidal cascade water feature;
 - Reconfiguration and upgrade of Darling Drive (part);
 - Provision of a new square adjoining the Chinese Garden;
 - Provision of a new open space 'event deck' (connected with the Exhibition Centre);
 - Integrated art, play zones, water play and recreation areas;

- Provision of retail kiosks;
- Provision of ground level parking within the Exhibition and Entertainment Centre facilities;
- Ground and elevated loading docks (accessed off Darling Drive) for Convention, Exhibition and Entertainment Centre facilities;
- Two vehicle drop off points off Darling Drive;
- Provision of signage; and
- Extension and augmentation of physical infrastructure / utilities as required.

2.3. Background

The existing convention, exhibition and entertainment centre facilities at Darling Harbour were constructed in the 1980s and have provided an excellent service for Sydney and NSW.

The facilities however have limitations in their ability to service the contemporary exhibition and convention industry which has led to a loss in events being held in Sydney.

The NSW Government considers that a precinct-wide renewal and expansion is necessary and is accordingly committed to Sydney reclaiming its position on centre stage for hosting world-class events with the creation of the SICEEP Project.

Following an extensive and rigorous Expressions of Interest and Request for Proposals process, Darling Harbour Live (formerly known as 'Destination Sydney' - a consortium comprising AEG Ogden, Lend Lease, Capella Capital and Spotless) was announced by the NSW Government in December 2012 as the preferred proponent to transform Darling Harbour and create the new Sydney International Convention, Exhibition and Entertainment Precinct.

Key features of the Darling Harbour Live Preferred Master Plan include:

- Delivering world-class convention, exhibition and entertainment facilities, including:
 - Up to 40,000m² exhibition space;
 - Over 8,000m² of meeting rooms space, across 40 rooms;
 - Overall convention space capacity for more than 12,000 people;
 - A ballroom capable of accommodating 2,000 people; and
 - A premium, red-carpet entertainment facility with a capacity of 8,000 persons.
- Providing up to 900 hotel rooms in a hotel complex at the northern end of the Precinct.

- A vibrant and authentic new neighbourhood at the southern end of the precinct, called ‘The Haymarket’, home to an IQ Hub focused on the creative industries and high-tech businesses, apartments, student accommodation, shops, cafes and restaurants.
- Renewed and upgraded public domain, including an outdoor event space for up to 25,000 people at an expanded Tumbalong Park.
- Improved pedestrian connections linking to the proposed Ultimo Pedestrian Network drawing people between Central, Chinatown and Cockle Bay Wharf as well as east-west between Ultimo/Pymont and the City.

2.4. Site Description

The SICEEP Site is located within the Darling Harbour precinct. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south.

The SICEEP Site has been divided into three distinct redevelopment areas (from north to south) – Bayside, Darling Central and The Haymarket. The PPP Application Site area is located within Bayside and Darling Central as shown in Figure 1.



Figure 1: The SICEEP development site

2.5. Planning Approvals Strategy

In response to separate contractual agreements with the NSW Government and staging requirements, Darling Harbour Live is proposing to submit a number of separate development applications for key elements of the overall Project.

This Application involves the PPP component of the SICEEP Project, comprising the convention centre, exhibition centre, entertainment facility, and associated public domain upgrades.

Development of The Haymarket is to be staged and accordingly a staged development application is to be lodged. Detailed development applications will follow seeking approval for specific aspects of The Haymarket.

A separate development application will also be submitted for the Hotel Complex.



Figure 2: Preferred Master Plan for the SICEEP development

3. THE WIND TUNNEL TEST

Modelling of the aerodynamic flow around a structure requires special consideration of flow conditions to obtain similitude between the model and the prototype. A detailed discussion of the similarity requirements and their wind tunnel implementation can be found in Cermak (1971, 1975, 1976). In general, the requirements are that the model and prototype be geometrically similar, that the approach mean velocity and turbulence characteristics at the model building site have a vertical profile shape similar to the full-scale flow, and that the Reynolds number for the model and prototype be equal. Due to modelling constraints, the Reynolds number cannot be made equal and Australasian Wind Engineering Society Quality Assurance Manual (2001) suggests a minimum Reynolds number of 50,000, based on minimum model width and wind velocity at the top of the model; in this study the modelled Reynolds number was over 50,000.

The wind tunnel test was performed in the boundary layer wind tunnel shown in Figure 3. The wind tunnel test section is 3.0 m wide, by 2.4 m high with a porous slatted roof for passive blockage correction. This wind tunnel has a 21 m long test section, the floor of which is covered with roughness elements, preceded by a vorticity generating fence and spires. The spires, fence, and roughness elements were designed to provide a modelled atmospheric boundary layer approximately 1.2 m thick with a mean velocity and turbulence intensity profile similar to that expected to occur in the region approaching the modelled area. The approach wind characteristics used for the model test are shown in Figure 4 and are explained more fully in Section 5.1.1.

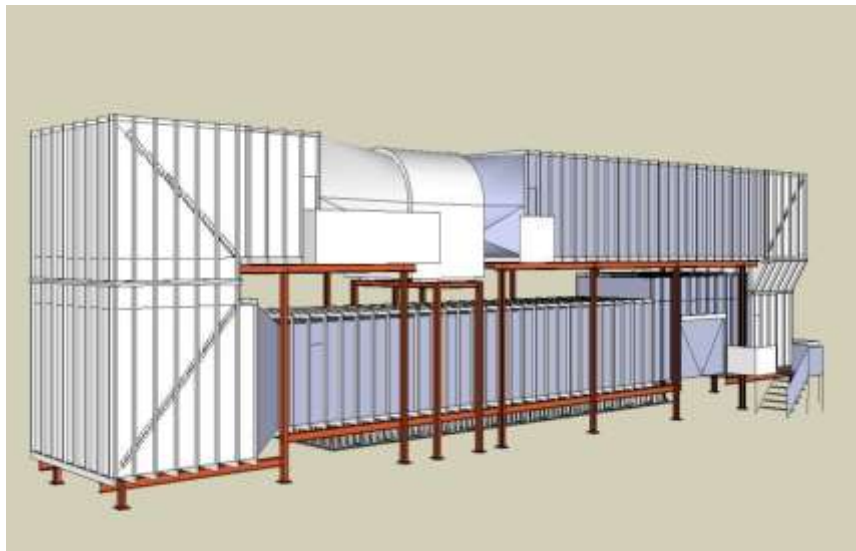


Figure 3: Schematic of the closed circuit wind tunnel

A model of the proposed development and surrounds to a radius of 570 m was constructed at a scale of 1:400, which was consistent with the modelled atmospheric flow, permitted a reasonable test model size with an adequate portion of the adjoining environment to be included in a proximity model, and was within wind tunnel blockage limitations. Significant variations in the building surface

were formed into the model. The models were mounted on the turntable located near the downstream end of the wind tunnel test section, Figure 5 and Figure 6. The turntable permitted rotation of the modelled area for examination of velocities from any approach wind direction. Additional photos of the testing are in Appendix 1. The model was tested in two configurations: one to assess the impact of the PPP component of the SICEEP project on existing surroundings (Configuration A), and one to assess the wind environment throughout the PPP component when surrounding components of the SICEEP project are completed. This was required to most comprehensively meet the DGR requirements for a Site wide Wind Report.

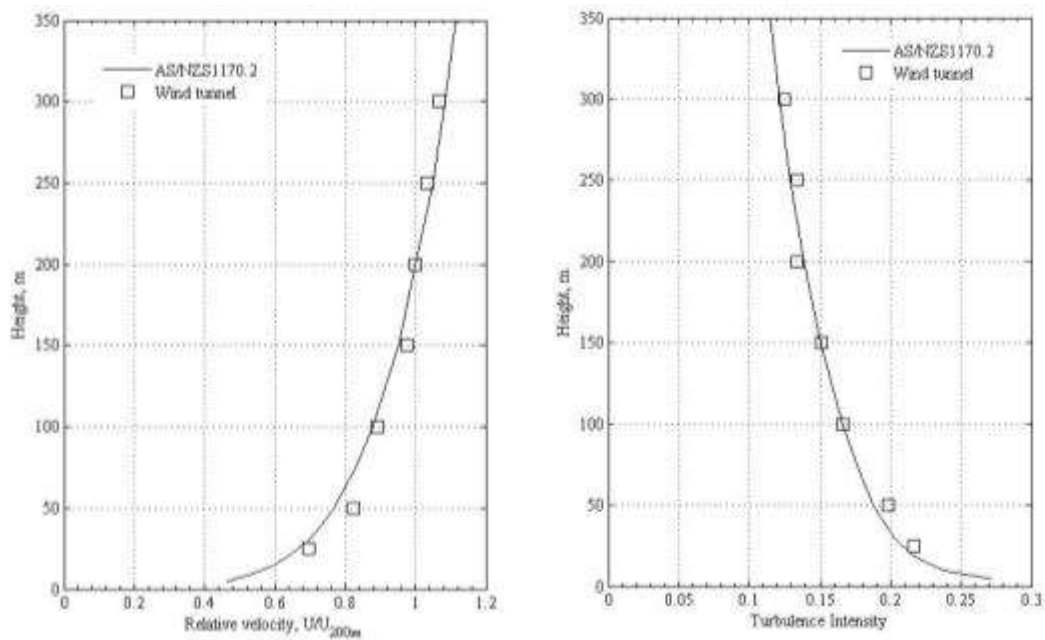


Figure 4: Mean velocity and turbulence profiles approaching the model



Figure 5: Photograph of Configuration A in the CPP wind tunnel



Figure 6: Photograph of Configuration B in the CPP wind tunnel

4. ENVIRONMENTAL WIND CRITERIA

Over the years, a number of researchers have added to the knowledge of wind effects on pedestrians by suggesting criteria for comfort and safety. Because pedestrians will tolerate higher wind speeds for a smaller period of time than for lower wind speeds, these criteria provide a means of evaluating the overall acceptability of a pedestrian location. Also, a location can be evaluated for its intended use, such as for an outdoor café or a footpath. One of the most widely accepted set of criteria was developed by Lawson (1990), which is described in Table 2.

Lawson’s criteria have categories for comfort, based on wind speeds exceeded five percent of the time, allowing planners to judge the usability of locations for various intended purposes ranging from “Business Walking” to “Pedestrian Sitting”. The level and severity of these comfort categories can vary based on individual preference, so calibration to the local wind environment is recommended when evaluating the Lawson ratings. The criteria also include a distress rating, for safety assessment, which is based on occasional (once or twice per year) wind speeds¹. In both cases, the wind speed used is the larger of a mean or gust equivalent-mean (GEM) wind speed. The GEM is defined as the peak gust wind speed divided by 1.85 for a typical turbulent environment; this is intended to account for locations where the gustiness is the dominant characteristic of the wind. Assessment using the Lawson criteria provides a similar classification as using the once per annum gust, which is the basis of the City of Sydney (2004) DCP, however provides information regarding the serviceability wind climate. The current City of Sydney (2012) DCP specifies wind effects not to exceed 16 m/s as the area is not classified as an ‘active frontage’. From discussions with Council this is a once per annum gust wind speed similar to the 2004 DCP, but is meant to be interpreted as a comfort level criterion similar to the lower limit of the Lawson “Business Walking” rating, and is not a distress requirement.

Table 2: Summary of Lawson criteria

Comfort (maximum of mean or gust equivalent mean (GEM ⁺) wind speed exceeded 5% of the time)	
< 4 m/s	Pedestrian Sitting (considered to be of long duration)
4 - 6 m/s	Pedestrian Standing (or sitting for a short time or exposure)
6 - 8 m/s	Pedestrian Walking
8 - 10 m/s	Business Walking (objective walking from A to B or for cycling)
> 10 m/s	Uncomfortable
Distress (maximum of mean or GEM wind speed exceeded 0.022% of the time)	
<15 m/s	not to be exceeded more than two times per year (or one time per season) for general access area
<20 m/s	not to be exceeded more than two times per year (or one time per season) where only able bodied people would be expected; frail or cyclists would not be expected

¹ The rating of “uncomfortable” in Table 2 is the word of the acceptance criteria author and may not apply directly to any particular project. High wind areas are certainly not uncomfortable all the time, just on windier days. The word uncomfortable, in our understanding, refers to acceptability of the site by pedestrians for typical pedestrian use; i.e., on the windiest days, pedestrians will not find the areas “acceptable” for walking and will tend to avoid such areas if possible. The distress rating fail indicates some unspecified potential for causing injury to a less stable individual who might be blown over. The likelihood of such events is not well described in the literature and is likely to be strongly affected by individual differences, presence of water, blowing dust or particulates, and other variables in addition to the wind speed.

5. DATA ACQUISITION AND RESULTS – WIND TUNNEL TESTS FOR DEVELOPMENT SPECIFIC PPP COMPONENT

5.1. Velocities

Velocity profile measurements were taken to verify that appropriate boundary layer flow approaching the site was established and to determine the likely pedestrian level wind climate around the test site. Pedestrian wind measurements and analysis are described in Section 5.1.2. All velocity measurements were made with hot-film anemometers, which were calibrated against a Pitot-static tube in the wind tunnel. The calibration data were described by a King's Law relationship (King, 1914)

5.1.1. Velocity Profiles

Mean velocity and turbulence intensity profiles for the boundary layer flow approaching the model are shown in Figure 4. Turbulence intensities are related to the local mean wind speed. These profiles have the form as defined in Standards Australia (2011) and are appropriate for the approach conditions.

5.1.2. Pedestrian Winds

The proposed development is located to the west of Sydney CBD to the south of Darling Harbour. The topography in the immediate vicinity is relatively flat, Figure 7 and Figure 8. For this report, wind speed measurements were recorded at 53 locations to evaluate pedestrian comfort around the project site, as shown in Figure 10 and Figure 11. The locations were tested for two configurations as described in Table 1. Velocity measurements were made at the model scale equivalent of 1.5 to 2.1 m above the ground surface for 16 wind directions at 22.5° intervals. Locations were chosen to determine the degree of pedestrian comfort at the building corners where relatively severe conditions are frequently found, near building entrances, on adjacent pavements with heavy pedestrian traffic, in open plaza areas, and on proposed terraces.

The hot-film signal was sampled for a period corresponding to one hour in prototype. All velocity data were digitally filtered to obtain the two to three second running mean wind speed at each point; this is the minimum size of a gust affecting a pedestrian. These local wind speeds, U , were normalised by the tunnel reference velocity U_{ref} . Mean and turbulence statistics were calculated and used to

calculate the normalised effective peak gust using $\frac{U_{pk}}{U_{ref}} = \frac{U + 3 \cdot U_{rms}}{U_{ref}}$.

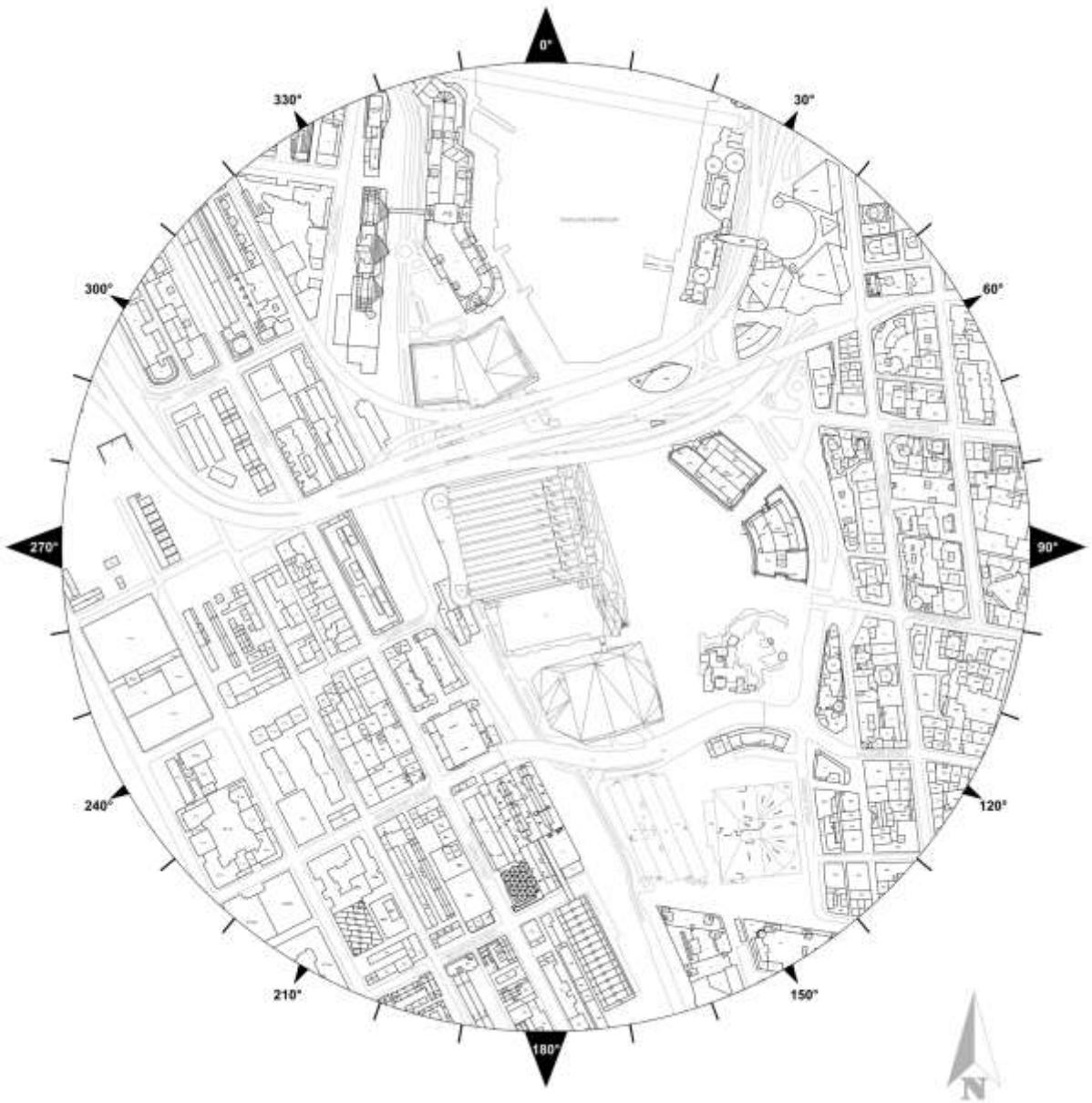


Figure 7: Extent of model for Configuration A

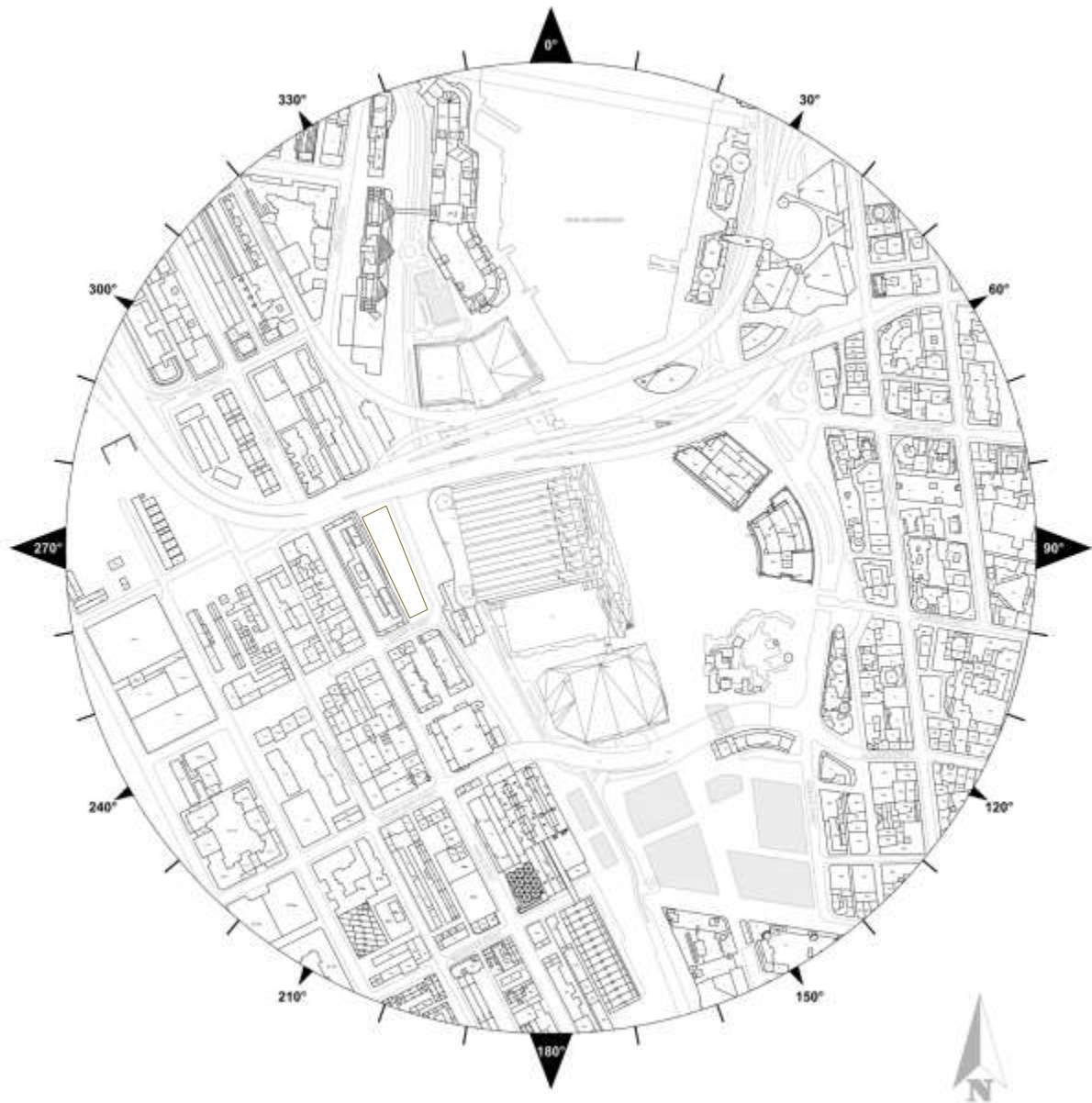


Figure 8: Extent of model for Configuration B

The mean and gust equivalent mean velocities relative to the free stream wind tunnel reference velocity at a full-scale elevation of 200 m are plotted in polar form in Appendix 2 and Appendix 3 for Configurations A and B respectively. The graphs show velocity magnitude and the approach wind direction for which that velocity was measured. The polar plots aid in visualisation of the effects of the nearby structures or topography, the relative significance of various wind azimuths, and whether the mean or gust is of greater importance.

To enable a quantitative assessment of the wind environment, the wind tunnel data were combined with wind frequency and direction information measured by the Bureau of Meteorology at a standard height of 10 m at Sydney Airport from 1974 to 2008, Figure 9. This anemometer location is considered the most appropriate for analysis of the historic wind climate as the approach flow is flat

and relatively consistent from all directions, and the immediate surrounds has not changed significantly through development over time compared with other anemometer locations nearer the Sydney CBD. From these data, directional criterion lines for the Lawson rating wind speeds have been calculated and included on the polar plots in Appendix 2 and Appendix 3; this gives additional information regarding directional sensitivity at each location.

The criteria of Lawson consider the integration of the velocity measurements with local wind climate statistical data summarized in Figure 9 to rate each location. From the cumulative wind speed distributions for each location, the percentage of time each of the Lawson comfort rating wind speeds are exceeded are presented in tabular form under the polar plots in Appendix 2 and Appendix 3. In addition to the rating wind speeds, the percentage of time that 2 m/s is exceeded is also reported. This has been provided as it has been found that the limiting wind speed for long-term stationary activities such as fine outdoor dining should be about 2 to 2.5 m/s rather than 4 m/s. Interpretation of these wind levels can be aided by the description of the effects of wind of various magnitudes on people. The earliest quantitative description of wind effects was established by Sir Francis Beaufort in 1806, for use at sea; the Beaufort scale is reproduced in Table 3 including qualitative descriptions of wind effects.

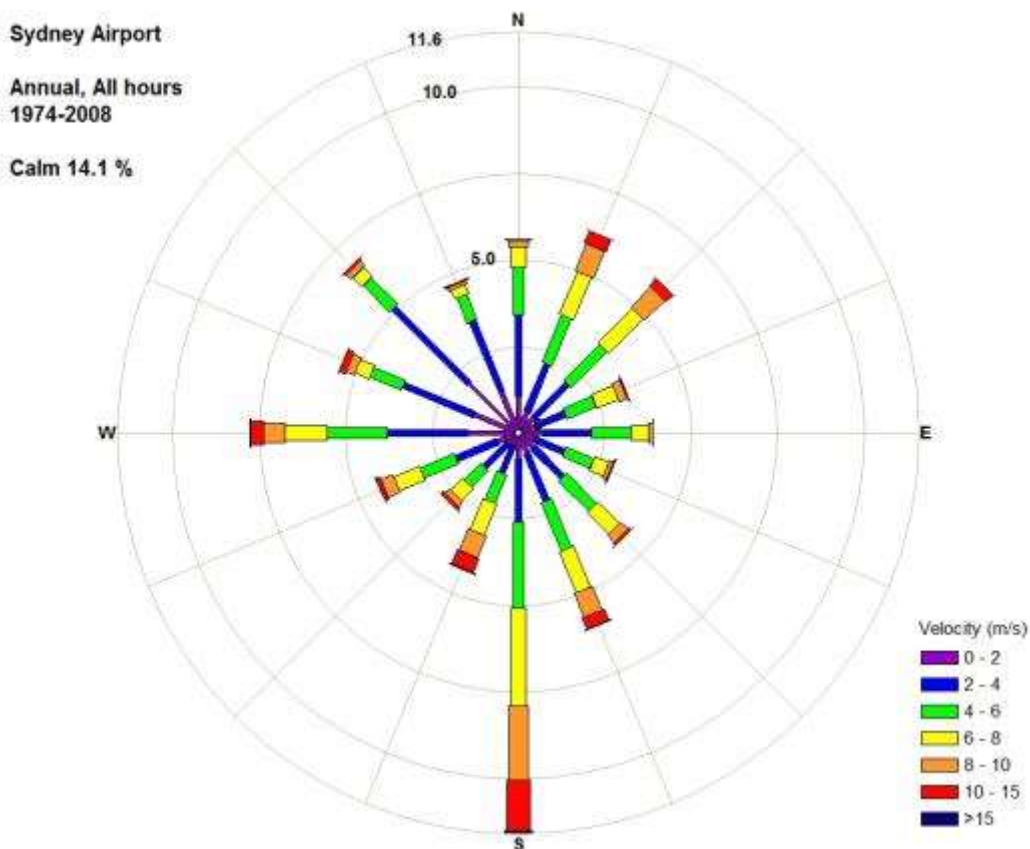


Figure 9: Wind rose of direction and speed for Sydney Airport

Table 3: Summary of wind effects on people, Penwarden (1973)

Description	Beaufort Number	Speed (m/s)	Effects
Calm, light air	0, 1	0–2	Calm, no noticeable wind.
Light breeze	2	2–3	Wind felt on face.
Gentle breeze	3	3–5	Wind extends light flag. Hair is disturbed. Clothing flaps
Moderate breeze	4	5–8	Raises dust, dry soil, and loose paper. Hair disarranged.
Fresh breeze	5	8–11	Force of wind felt on body. Drifting snow becomes airborne. Limit of agreeable wind on land.
Strong breeze	6	11–14	Umbrellas used with difficulty. Hair blown straight. Difficult to walk steadily. Wind noise on ears unpleasant. Windborne snow above head height (blizzard).
Near gale	7	14–17	Inconvenience felt when walking.
Gale	8	17–21	Generally impedes progress. Great difficulty with balance in gusts.
Strong gale	9	21–24	People blown over by gusts.

The tables in Appendix 2 and Appendix 3 additionally provide the wind speed exceeded 5% and 0.022% of the time for direct comparison with the Lawson criteria and the associated Lawson ratings for both mean and GEM wind speeds. The wind speeds for the 0.022% case can be multiplied by 1.4 for general comparison with the City of Sydney Council (2012) requirements. A colour coded summary assessment of pedestrian comfort and safety with respect to the Lawson criteria is presented in Figure 10 for each test location in Configuration A, Figure 11 for similar locations in Configuration B. Because some pedestrian wind measurement positions are purposely chosen at sites where large velocities of small spatial extent may exist, the general wind environment about the structure may be less severe than one might infer from an analysis only of the plots. The implications of the results are discussed in Section 6.

It should be noted that Sydney is relatively windy, with an average wind speed at 10 m reference height of approximately 4 m/s (8 kt, 14 kph) at Sydney Airport, and five percent of the time the mean wind speed is in excess of 9.5 m/s (18 kt, 34 kph). Converting the five percent of the time wind speed at Sydney Airport to a typical pedestrian level in a generic urban environment of similar building massing to SICEEP would result in about 6.0 m/s (12 kt, 22 kph). Comparing this with the comfort criteria of Table 2 suggests that the pre-existing locale would only just be acceptable for pedestrian walking prior to development; hence any recreational outdoor activity for any significant development of this site will likely require significant amelioration from prevailing Sydney wind directions. Indeed it will be difficult for areas throughout SICEEP to meet the most stringent fine dining 2m/s criterion given this pre-existing condition.

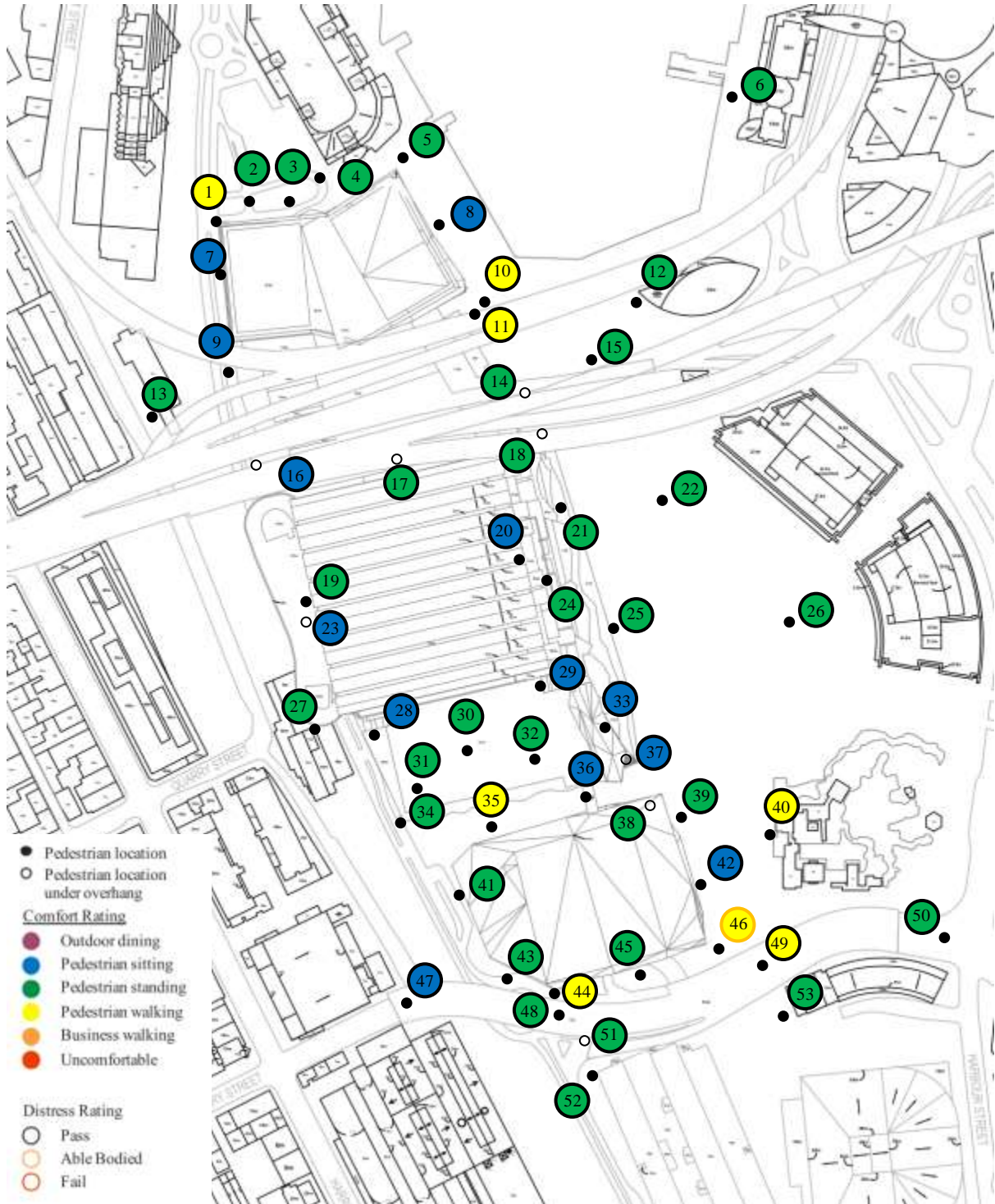


Figure 10: Pedestrian wind speed measurement locations with ratings for Configuration A

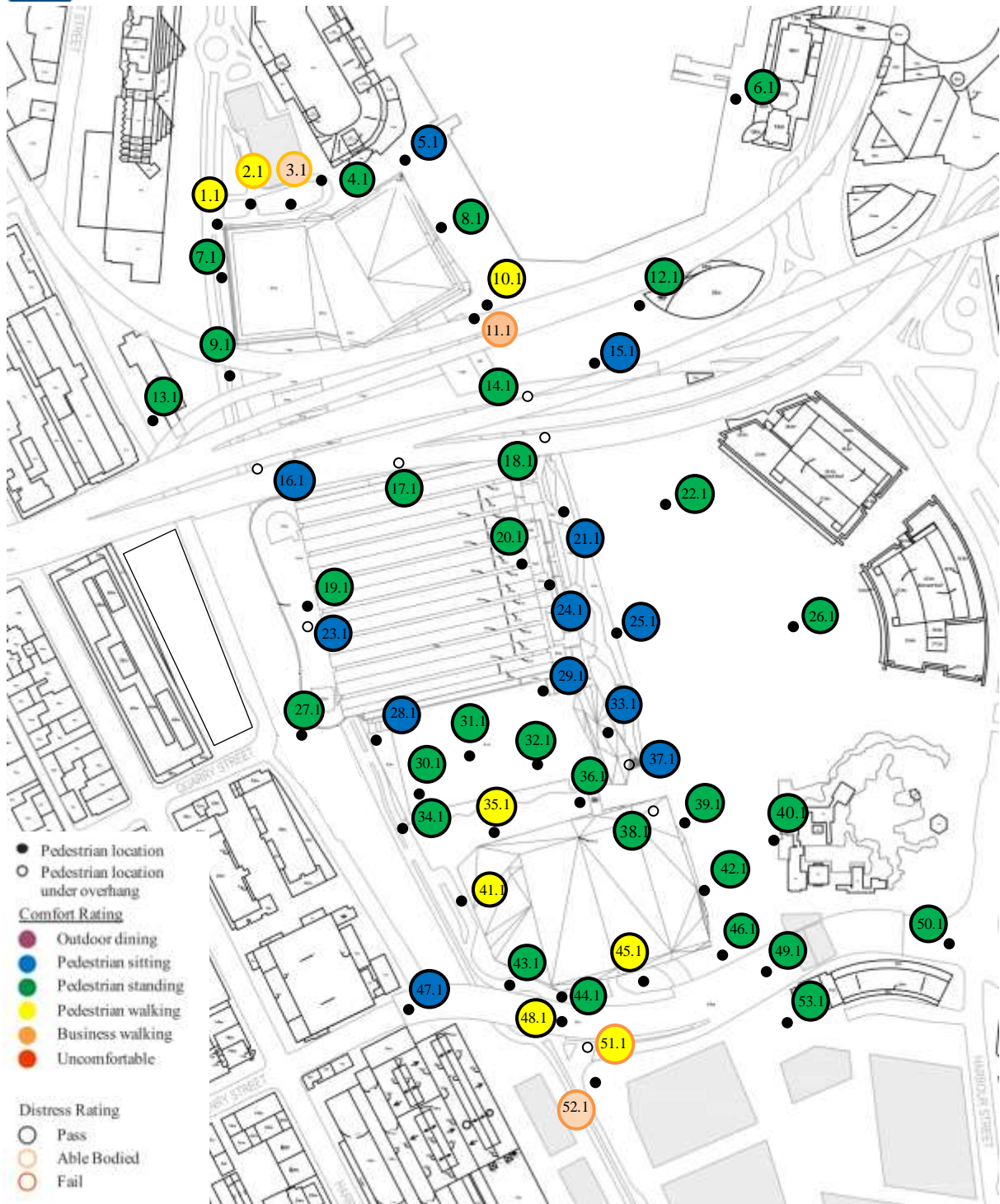


Figure 11: Pedestrian wind speed measurement locations with ratings for Configuration B

6. DISCUSSION - WIND TUNNEL TESTS FOR DEVELOPMENT SPECIFIC PPP COMPONENT

The wind climatology chart of Figure 9 indicates that the most frequent strong winds are from the south, and to a lesser extent, the west and north-east. The locations tested around the development site are susceptible to winds from different directions, depending on the relative location of the point tested to the building geometry and surrounds. However, in general terms winds from the north and south quadrants had the most pronounced effect on the site as these winds are uninterrupted on crossing Darling Harbour. The influence of wind direction on the suitability of a location for an intended purpose can be ascertained from the graphs in Appendix 2 and Appendix 3.

The primary conclusions of the pedestrian study can be understood by reviewing the colour coded images of Figure 7 to Figure 11, which depict the locations selected for investigation of pedestrian wind comfort around the site along with the Lawson criteria rating for both comfort and distress. The central colour indicates the comfort rating for the location, and the colour of the outer ring indicates whether the location passes the distress criterion. Mitigation measures are likely to be required for red locations, as well as orange locations on main pedestrian thoroughfares, and may be necessary for other locations depending on the intended use of the space and to meet the City of Sydney 'active frontage' requirement. Although wind conditions may be classified acceptable there may be certain wind directions that cause regular strong events, these can be determined by an inspection of the plots in Appendix 2 and Appendix 3. Note that testing was performed without planned trees, or other plantings to provide a worst case assessment; heavy streetscape planting typically reduces the wind speeds by less than 10%.

6.1. Configuration A Results

The Configuration A tests (Figure 7 and Figure 10) were conducted with the proposed International Convention Centre (ICC), ICC Exhibition Centre, and The Theatre in place, and with surrounding buildings as they exist today. The proposed development has an approximately north – south alignment of low to mid-rise building massing, with moderately exposed north and south facing facades.

It is evident from Figure 10 that the wind environment around the proposed development in Configuration A is generally satisfactory for pedestrian standing or walking, with some locations calm enough for formal pedestrian sitting. All locations passed the general distress criterion, with the exception of Location 46, which is rated as acceptable for able bodied patrons only. As discussed earlier in Section 5, the pre-existing locale would only just be acceptable for pedestrian walking prior to development. Indeed, the general wind amenity of the site is similar to wind conditions remote from the site investigated at locations 6, 26 and 50, which are suitable for pedestrian standing. These

surrounding locations give a general indication of the existing surrounding wind climate and can be used for comparison with the wind environment in and around the proposed PPP development.

Adjacent to the north façade of the ICC building, the wind environment at ground level is considered to be acceptable for pedestrian standing at most locations (i.e. at Locations 2 to 5). Location 1 is rated as suitable for pedestrian walking. The slightly windier conditions at this location can be attributed to a small amount of downwash off the northern façade of the Convention Centre during winds approaching from approximately the north to north east accelerating around the base corner of the building.

The wind amenity adjacent to the west façade of the ICC building at ground level were measured to be relatively calm, and Locations 7, 9 and 16 are rated as suitable for casual pedestrian sitting activities. Also on the west side of the Convention Centre, yet slightly more distant from the proposed building, Location 13 was rated as suitable for pedestrian standing.

Towards the north end of the east façade of the ICC building, Location 8 is considered suitable for casual pedestrian sitting activities. Stronger winds were encountered at Locations 10, due to the location's exposure to winds from the north east quadrant blowing over the harbour, and also due to a small amount of downwash of the taller section of the east façade reaching ground level. This location is rated as suitable for pedestrian walking. Winds at this location passed the distress criterion however further treatment will be required if these areas are to be designated for outdoor stationary type activities. The spatial extent of these windier conditions is small, and Locations 14 and 18, positioned under the M4 motorway were calmer. Both of these locations are considered suitable for pedestrian standing activities.

Location 11 is situated above ground level, adjacent to the pedestrian walkway on the north edge of the elevated M4 motorway. Above ground level, this location will be inherently windy, and a small amount of additional flow is directed from the façade of the ICC building towards the walkway during winds from the north east. However, this location was rated as suited for a pedestrian walkway, and from a wind perspective is acceptable as a pedestrian thoroughfare.

Further from the proposed development, Locations 12 and 15 are rated as acceptable for pedestrian standing. The strongest winds at these locations appear to be due to the exposure across the harbour to the north and across Tumbalong Park to the south, and appear to be pre-existing and not adversely impacted by the proposed development.

Location 17 is situated under the motorways at a stairway access between the ICC Exhibition Centre and the ICC building. The wind conditions at this location are considered suitable for pedestrian standing, and suitable as a pedestrian accessway from a wind perspective.

Adjacent to the west façade of the proposed ICC Exhibition Centre building, ground level wind conditions are relatively calm. Location 19, which is situated in the elevated loading bay area, is rated as acceptable for pedestrian standing and is expected to be suitable for a loading/unloading dock area. Location 23 is positioned under the loading dock at ground level, and was found to be well shielded. This location is regarded as suitable for pedestrian standing. Location 27, which is situated at walkway height at the existing monorail station is also rated as suitable for pedestrian standing, and from a wind perspective is considered suitable as a pedestrian accessway between Quarry Street and the proposed development.

Locations 20, 21, 24 and 25 are situated adjacent to the east façade of the ICC Exhibition Centre. Location 20, which is positioned on an upper level patio space, and Location 24, which is situated on a mid-level patio space, are both rated as suitable for casual pedestrian sitting and pedestrian standing, respectively. The strongest winds at these locations tend to be from the north-east or south-east, when winds from these directions are directed along the face of the building. These locations are considered suitable for use as casual gatherings and functions, and the articulated nature of the east façade of the ICC Exhibition Centre can provide localised sheltered locations. However, if these locations (and similar spaces along the east façade) are intended for long term stationary activities such as extended restaurant dining, additional local screening will be necessary.

The wind amenity at Locations 21 adjacent The Boulevard is expected to be below the 4m/s casual sitting threshold approximately 90% of the time and suitable for short-term stationary type activities such as window shopping. Location 25 on The Boulevard is rated as acceptable for pedestrian standing, and from a wind perspective will be well suited to pedestrian strolling type activity.

Location 22 and 26 are on the east side of the development, positioned at distant locations from the site in Tumbalong Park. The strongest winds at these locations occur from the south east, as both points are exposed to this location, and they do not appear to show adverse wind amenity due to the influence of the proposed development. Both locations are rated as suitable for pedestrian standing.

The stairways to the event deck at the west (Location 28) and the east (Location 29) were found to be well shielded, and are considered acceptable for pedestrian sitting. The event deck (Locations 30, 31 and 32) are rated as acceptable for pedestrian standing, and is suited for casual gatherings and events. The strongest winds on the event deck occur when winds from the south-west or north-east are channelled between the ICC Exhibition Centre and The Theatre. Winds from the north east typically occur during the warmer months, and can bring a welcomed cooling breeze to the deck. The event deck is expected to be below the casual seated activity threshold of 4m/s approximately 80% to 90% of the time, which could be further improved with local screening. Local screening will be necessary if the space is to be used to host long term stationary alfresco dining type activities.

The entry area at the south-east corner of the ICC Exhibition Centre is well shielded, with a relatively calm wind environment in this area. Location 33 and the top of the stairway, and Location 37 at the base of the stairs are both rated as suited as acceptable for pedestrian sitting.

The wind environment through Tumbalong Place (Locations 34, 35 and 36), which lies between the ICC Exhibition Centre and The Theatre building, varies with location. Location 34, positioned at the south-west corner of the ICC Exhibition Centre building, is considered suitable for pedestrian standing, with shielding from most directions. Location 35, which is located adjacent to the low-rise section at the west of The Theatre building was slightly windier, being rated as acceptable for pedestrian walking. At this location, the windiest conditions occurred during winds from the north and the south due to re-circulating flow. Further to the east of Tumbalong Place in close proximity to the overhead walkway between the The Theatre and ICC Exhibition Centre, Location 36 is rated as suited to casual pedestrian sitting activities. Whilst all points within Tumbalong Place pass the distress criterion, this zone will be further examined during detailed landscape design to ensure wind amenity.

Along the west façade of The Theatre building, the strong conditions occur when winds from the south are diverted around the eastern corner of The Theatre building, although in general this area was relatively calm. Locations 41 and 43 are both considered suitable for pedestrian standing.

Locations 38 and 39 are both in the vicinity of the entry area at the north-east corner of The Theatre. This entry area will be windiest when winds from either the north-west or south-east channel beneath the undercroft area in which the entrance is located. However, both locations are regarded as acceptable for pedestrian standing activities, which is suitable for a lobby entry area from a wind perspective.

Location 40 is positioned near the west side of the Chinese Garden, and is suited to pedestrian walking activities. This location is exposed to winds from many directions, and the conditions at this point are similar from most directions. Conditions inside the gardens are likely to be slightly calmer due to its sheltered layout.

At the midpoint of the east façade of The Theatre, conditions are quite calm, with location 42 being rated as suitable for casual pedestrian sitting activities. Similarly, at the midpoint of the south façade, location 45 is also relatively calm, and is acceptable for pedestrian standing activities.

Wind conditions were windier at the corners of The Theatre's south facing façade. Location 44 at the south west corner of The Theatre is rated as suitable for pedestrian walking, and passed the general distress criterion. The wind environment at Location 46 at the south east corner of The Theatre is more onerous. Wind conditions at this location slightly exceed the general distress criterion, being suited for pedestrian walking and able bodied patrons only. The strong conditions at the location are largely caused by winds from the south. Winds from this direction encounter the

southern façade of The Theatre, and are then pushed to street level in the form of downwash and accelerated around the south-east corner of the proposed development. The extension of an awning along the south and east facades may help mitigate the conditions to be further investigated during detailed design.

Along the Pier Street overpass, wind conditions at Locations 47, 48, 49 and 50 are considered suitable for a pedestrian accessway. Further south of the proposed development, Locations 51, 52 and 53 were also all regarded as suitable for pedestrian standing.

While the wind conditions at the proposed development are, in general, relatively calm, with several locations being acceptable for casual pedestrian sitting, conditions at many locations around the proposed development in Configuration A are windier than the more stringent outdoor dining criteria. Any locations planned for use as outdoor café spaces or alfresco dining locations are likely to require additional protection with local screening to create an environment suitable for this purpose.

6.2. Configuration B Results

The Configuration B tests (Figure 8 and Figure 11) were conducted with the proposed ICC, ICC Exhibition Centre, and The Theatre buildings in place as per Configuration A, with the additional proposed multi-building PDA Haymarket redevelopment to the south of site, and the proposed ICC Hotel to the north of site. Configuration B also includes the removal of the monorail station, and the addition of a data centre planned for construction on Pymont Street. The assessment of Configuration B provided below should be read in conjunction with the description of Configuration A provided above.

The wind amenity throughout much of the development for Configuration B is similar to that for Configuration A, with some variation as described below. All locations passed the general distress criterion, with the exception of Locations 2.1 and 3.1, which are discussed below. The most significant variation between the two configurations is seen in close proximity to the respective building geometric changes between the two configurations. Discussion for the Configuration B wind environment is concentrated on these differences.

At the north end of the proposed development, windy conditions exist at ground level in the area between the ICC building and the ICC Hotel with higher intensity than Configuration A (Location 1.1 is rated for pedestrian walking and passes the general distress criterion, Location 2.1 is suited to pedestrian walking and is acceptable for able bodied patrons only, while Location 3.1 is suited to business walking and able bodied patrons only). The most onerous conditions at Location 2.1 and 3.1 are caused by winds from the north east quadrant. The faster ground level conditions at these locations are caused by a combination of downwash off the Hotel, and channelling between the Hotel and the ICC building. Much of this effect is due to the general massing of the two structures. However the

assumed shape of the Hotel used during testing, in which lower portion of southern Hotel tower underhangs the bulk of the tower, will be also be facilitating these faster wind conditions. The spatial extent of these faster winds is relatively small; Location 4.1 at the south east corner of the Hotel is suited to pedestrian standing, and passes the general distress criterion. Amelioration measures will be required to mitigate conditions, but will be dependent on the final form of the Hotel.

Location 11.1, adjacent to the elevated pedestrian walkway on the north side of the motorways passing over the site was found to be windier in Configuration B. This location is rated as suitable for business walking, and able bodied patrons only. The windiest conditions occur at this location during winds from the north east quadrant. Being elevated, the location will inherently be exposed to windier conditions than at ground level. Additional wind is forced along the east façade of the ICC building by the massing of the ICC Hotel, which allows less of these winds to pass around the west side of the ICC building. The section of walkway affected by these windier conditions is likely to be quite localised, and be mitigated through the use of solid or porous vertical screening elements on the sides of the walkway. The arrangement and extent of these screens can be determined during detailed design.

Little variation is seen between the wind amenity along the east and west facades of the Convention and Exhibition Centres. For example, Location 27.1, at the pedestrian overpass to Quarry Street is still rated as suitable for pedestrian standing, and is well suited as a pedestrian accessway from a wind perspective. For Configuration B, the wind environment over the event deck (Locations 30.1 to 32.1) is rated as suited to pedestrian standing, as per Configuration A, and Tumbalong Place (Locations 34.1 to 36.1) shows only minor variation from Configuration A.

In general, the wind conditions immediately adjacent to the facades of The Theatre are generally similar in Configuration B to that observed for Configuration A. It is noted that Location 46.1 is significantly calmer in Configuration B. The massing of the Haymarket precinct provides additional shielding to The Theatre to winds from the south, and this location is rated as acceptable for pedestrian standing and passing the general distress criterion for Configuration B.

A localised area of faster conditions were observed south of the PPP development at Locations 48.1, 51.1 and 52.1. Locations 48.1 and 51.1 were rated as acceptable for pedestrian walking, and Location 52.1 for business walking. Both Location 51.1 and 52.1 did not pass the general distress criterion, and were rated for able bodied patrons only. These faster conditions are largely due to channelling and downwash from the Haymarket precinct development during winds from the south quadrant, with the PPP development buildings not adversely impacting this area. It is noted that the location and intensity of faster street level conditions created in the vicinity of the Haymarket precinct will be dependent on the final form of the buildings within the precinct, which has not been finalised. Such conditions can be addressed during the development of the Haymarket precinct design.

7. QUALITATIVE ASSESSMENT: SITE WIDE

Wind tunnel testing conducted for the State Significant Development Application (SSD 12_5752) has been mostly limited to measuring wind speeds at test points within the PPP domain. Notwithstanding, the test locations described in Section 6 have locations on the edges of the ICC Hotel to the north, and Haymarket precincts to the south of the PPP, Figure 12. The two towers of the ICC Hotel are proposed to rise approximately 127 m (south tower) and 86 m (north tower) above ground level without a podium, Figure 13. The proposed building layout for the Haymarket precinct with heights is illustrated in Figure 14.

The following provides opinion based qualitative assessment of wind conditions throughout the ICC Hotel and Haymarket precincts with reference to available results from the PPP wind tunnel tests. Later site specific wind tunnel tests will be conducted at Development Application stage for each precinct.

7.1. The ICC Hotel

The ICC Hotel rises to a greater height than the surrounding buildings and therefore is exposed to prevailing winds from the north-east, south, and west quadrants. With the wind normal to the face of the towers, these upper level winds will be brought to ground level in the form of vertical downwash flow creating windier conditions at ground level adjacent to the development. The lack of podium will result in downwash being undisturbed upon reaching ground level generating windy conditions at pedestrian locations. The tapering of the south tower façade below level 10 will cause accelerated flow around the southern corners for winds from the south. This is expected to produce localised strong winds, classified for walking or business walking and exceeding the general distress criterion at some locations. This has already been measured at Locations 1 to 3 in the PPP wind tunnel tests in Configuration B, Figure 11, where downwash and channelling between the Hotel and Convention Centre building produce windy conditions.

Windy conditions are also expected at other locations around the base of the two Hotel towers, and will likely require amelioration measures to produce an amenable ground level wind environment, particularly at any locations intended for cafés or alfresco dining, or high pedestrian activity.

The degree of wind mitigation required will depend on the intended use of the space, the final form of the hotel, and the directional wind climate. It is understood the design of the hotel is not finalised. A mitigation strategy can be developed with the design team during development of the hotel building form.



Figure 12: Architectural impression of the proposed SICEEP Project site viewed from the east



Figure 13: East elevation of the ICC and ICC Hotel

7.2. The Haymarket Precinct

The Haymarket Precinct (Figure 14 and Figure 15) is more protected from a wind perspective by surrounding buildings than the ICC Hotel. Although the Haymarket Precinct is only seeking approval for building envelopes, the illustrative scheme indicates that the precinct is likely to include a combination of high-rise and mid-rise buildings, with a variety of podia structures throughout the development.

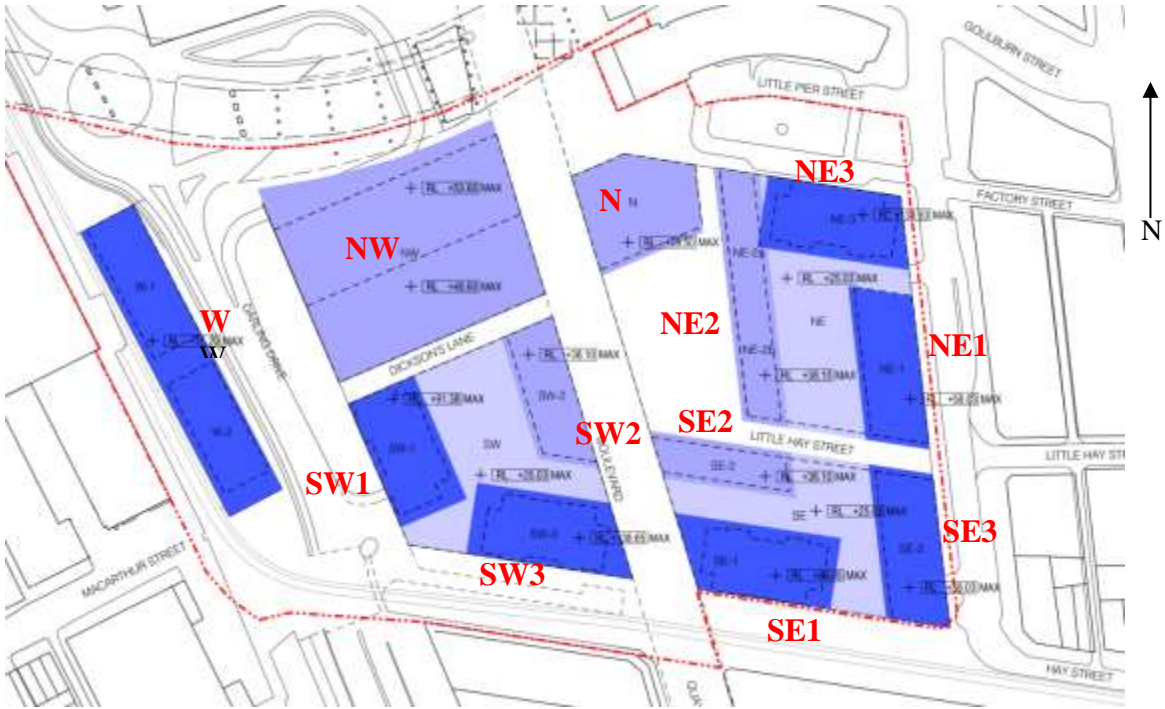


Figure 14: Maximum height envelope of the Haymarket precinct

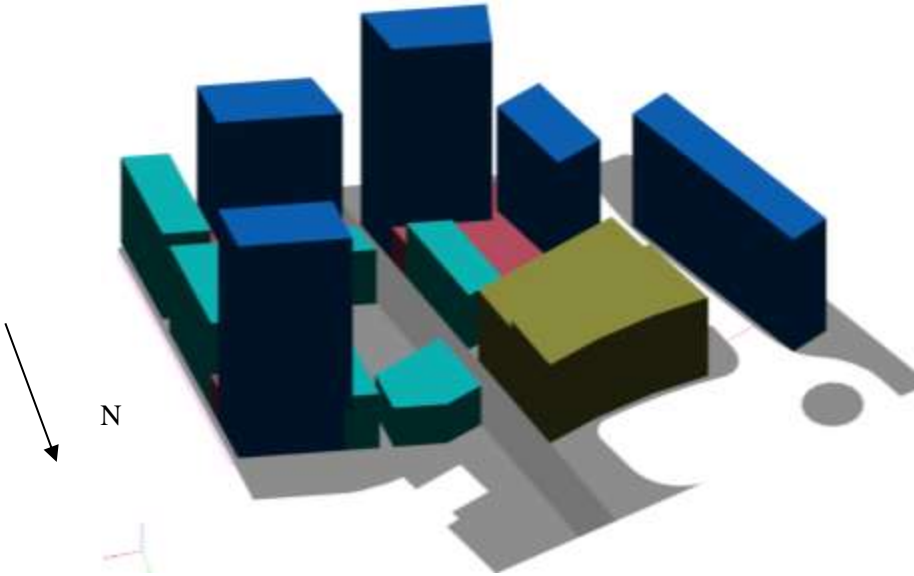


Figure 15: Perspective view of the maximum building envelope of The Haymarket precinct, viewed from the north.

Taller buildings will induce downwash for wind directions normal to the façade of the tower, and at locations where the tower façade extends to ground level with little to no interference from a

podium. In these cases windy conditions can be expected at the ground-level windward corners of the buildings. An example of such a location where there is potential for this to occur is between the SW3 and SE1 towers.

Instances of channelling wind flow are expected to occur for the currently configured massing between the student housing to the west of the precinct for winds from the west, and along Darling Drive, the Boulevard and Harbour Street during winds from the south. This will produce localised strong wind conditions possibly exceeding the walking criterion without amelioration.

During the PPP tests described in Figure 6, Figure 8 and Figure 11, an indicative massing model of the Haymarket precinct was included with some measurements taken over the northern perimeter. A localised area of faster conditions was observed during the wind tunnel testing of the PPP development at the northwest corner of the Haymarket precinct. These faster conditions result primarily from a combination of channelling and downwash during winds from the south quadrant, with the PPP development buildings to the north not adversely impacting this area. The occurrence of such conditions will be dependent on the final form of the buildings within the precinct, and can be addressed during the detail design of the buildings.

A mitigation strategy can be developed with the design team during development of the Haymarket building forms, which could include a combination of horizontal and vertical wind breaks, and a more advantageous overall shape of the buildings and its lower level layout. Mitigation strategies such as awnings, fins, or landscaping would be developed during detailed design.

Other areas within The Haymarket precinct such as the Urban Square are expected to receive wind shielding from prevailing winds by surrounding building structures and are expected to be better suited for pedestrian sitting activities such as outdoor dining.

8. CONCLUSIONS

A wind impact assessment has been conducted of the proposed SICEEP development. This report addresses the Director-General's Requirements for an assessment of the impact of the development on the amenity of the wind environment of the site. The report addresses the full site. A wind tunnel investigation of the pedestrian level wind environment around the proposed SICEEP PPP development has been conducted. The street level wind environment at most locations has been found to be similar to, or calmer than, typical street level wind conditions in the surrounding areas. Most locations in the public domain were found to pass the distress criterion and the few points not meeting this level were rated suitable for able bodied patrons only.

8.1. Wind Tunnel Study of Development Specific PPP Components

In Configuration A, Location 46 is rated as suited only to abled bodied patrons, Figure 7. Winds at this location can be ameliorated during detailed design. In Configuration B, Figure 8, Locations 2.1 and 3.1 are rated as acceptable for able bodied patrons only, and Location 3.1 rated as only suitable for business walking. This was due to the overall massing of both the ICC building and the ICC Hotel building, but also the additional influence of the Hotel's shape. Winds at these locations can be treated during the development of the final form of the Hotel. Location 11.1, at an elevated pedestrian walkway adjacent to the M4 road deck, was also rated as suited only for business walking and to able bodied pedestrians, and can be treated during detailed design through the use of local vertical screens. Locations 51.1 and 52.1 were also rated only for able bodied patrons only. Location 52.1 was only rated as suitable for business walking. However, it is expected that the winds at location 51.1 and 52.1 can be treated during the development of the design for the Haymarket precinct.

In terms of wind comfort, most locations throughout the development achieve Lawson wind comfort ratings suitable for intended outdoor recreational activities as discussed in the body of the report. The event deck was found to be suited for pedestrian standing activities in both configurations examined, and from a wind perspective is well suited to informal gatherings and functions. In general, the conditions around the proposed development are considered to be relatively calm, particularly for an inner city location. It is noted that while several locations are rated as suited to casual outdoor sitting activities, no locations met the more rigorous formal outdoor dining threshold. Localised screening is recommended for any locations planned for long term stationary activities such as alfresco and café dining for optimal wind amenity.

8.2. Qualitative Assessment Site Wide

Quantitative wind tunnel results have been used to assist in the qualitative prediction of the wind conditions around the ICC Hotel, and in the Haymarket precinct and extend the study to whole of the Preferred Masterplan. Windy conditions are expected around the base of tall buildings without a

podium. It is understood the design of the ICC Hotel and Haymarket precinct buildings are not finalised.

The strength of the conditions in windy locations will depend on the final architectural form of the towers and other structures of the ICC Hotel and Haymarket precinct buildings, and can be confirmed using wind tunnel tests at later stages of the design. Detailed serviceability issues associated with landscaping, outdoor cafes, door placement, internal pressure issues etc. will be considered during further design development and will require wind tunnel testing for verification. A mitigation strategy can be developed with the design team during development of the Haymarket and ICC Hotel building forms. Mitigation strategies such as awnings, fins, or landscaping would be developed during detailed design.

9. REFERENCES

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Architectural Drawings

Assessment of wind effects in this report has been based upon development drawings prepared by Darling Harbour Live February 2013.

Appendix 1: Additional Photographs of the CPP Wind Tunnel Model



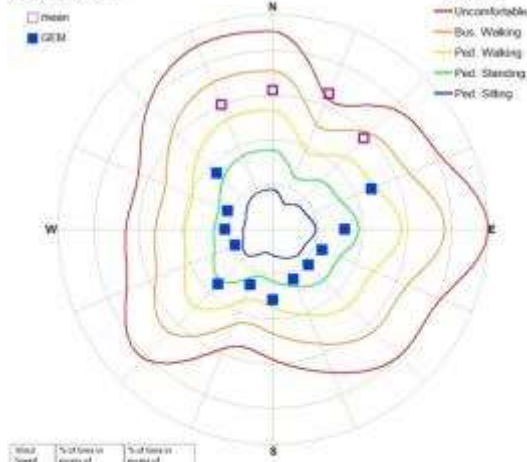
Figure 16: Configuration A, viewed from the east.



Figure 17: Configuration B, viewed from the south.

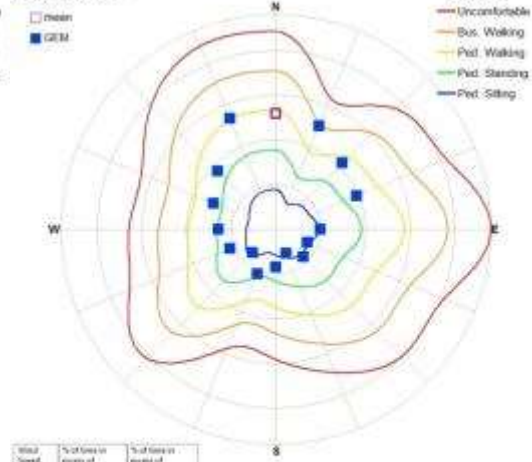
Appendix 2: Directional Wind Results for Configuration A

LOCATION 1



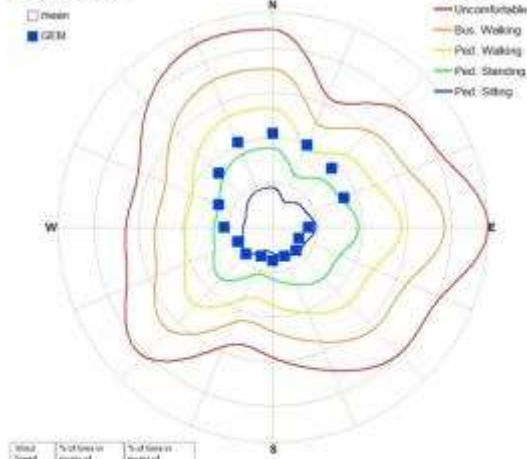
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	49.1	56.9
4.0	17.5	17.5
6.0	5.9	4.2
8.0	2.2	1.0
10.0	0.6	0.3
6.5	6.8	Ped. Walking
12.8	0.012	Ped. Sitting
3.7	Ped. Standing	5.8
11.0	Ped. Sitting	0.012

LOCATION 2



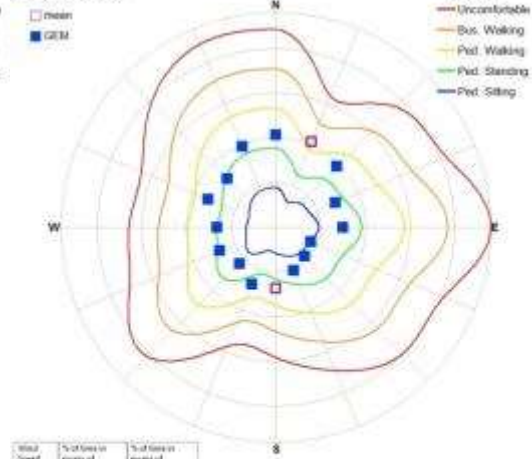
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.4	63.5
4.0	6.1	10.5
6.0	2.2	2.8
8.0	0.3	0.3
10.0	0.0	0.0
4.5	5.8	Ped. Standing
9.8	0.012	Ped. Sitting
3.1	Ped. Standing	5.8
10.0	Ped. Sitting	0.012

LOCATION 3



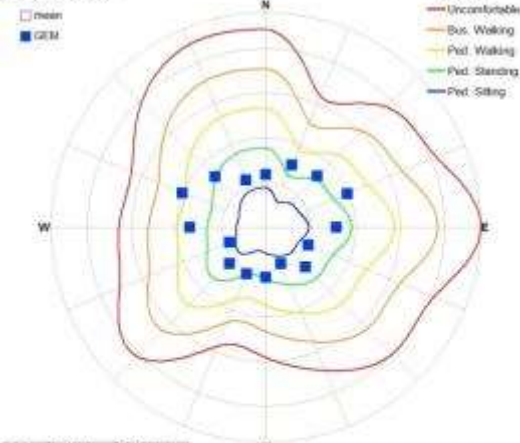
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.7	59.0
4.0	5.2	8.3
6.0	0.9	0.8
8.0	0.0	0.0
10.0	0.0	0.0
5.5	5.8	Ped. Sitting
7.7	0.012	Ped. Sitting
4.7	Ped. Standing	5.8
9.8	Ped. Sitting	0.012

LOCATION 4



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.8	50.5
4.0	7.6	6.0
6.0	0.9	1.1
8.0	0.0	0.0
10.0	0.0	0.0
4.4	5.8	Ped. Standing
9.2	0.012	Ped. Sitting
4.6	Ped. Standing	5.8
6.2	Ped. Sitting	0.012

LOCATION 5



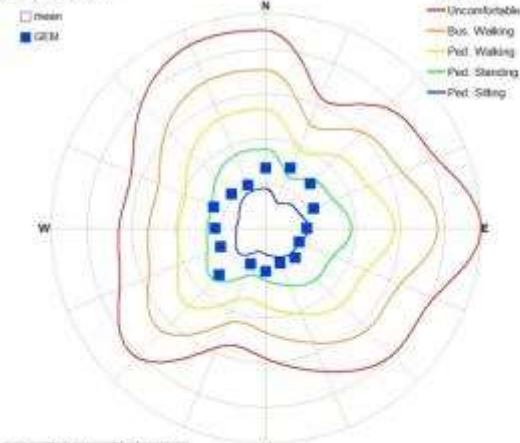
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	74.9	49.9
4.0	2.2	9.9
6.0	0.1	0.7
8.0	0.0	0.1
10.0	0.0	0.0
1.7	N/A	Ped. Sitting
7.0	0.012	Pass
1.0	Ped. Standing	N/A
6.2	Pass	0.012

LOCATION 6



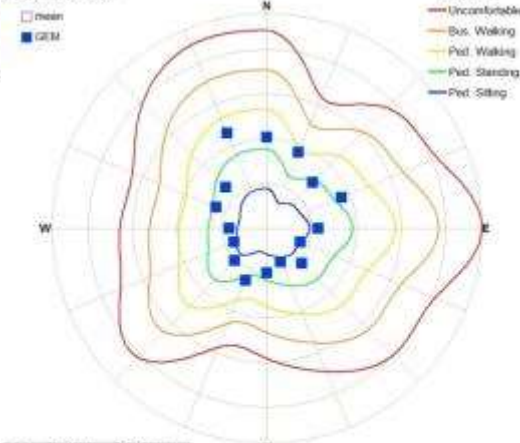
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	44.7	15.1
4.0	20.8	12.7
6.0	1.0	1.2
8.0	0.0	0.4
10.0	0.1	0.0
1.7	N/A	Ped. Standing
11.1	0.012	Pass
1.0	Ped. Standing	N/A
1.8	Pass	0.012

LOCATION 7



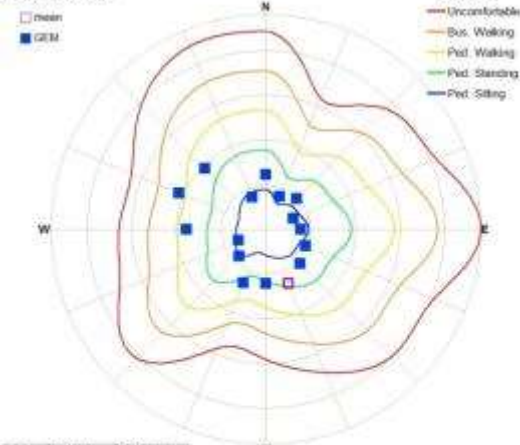
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	73.0	30.7
4.0	0.7	1.9
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.7	N/A	Ped. Sitting
7.0	0.012	Pass
1.0	Ped. Standing	N/A
6.0	Pass	0.012

LOCATION 8



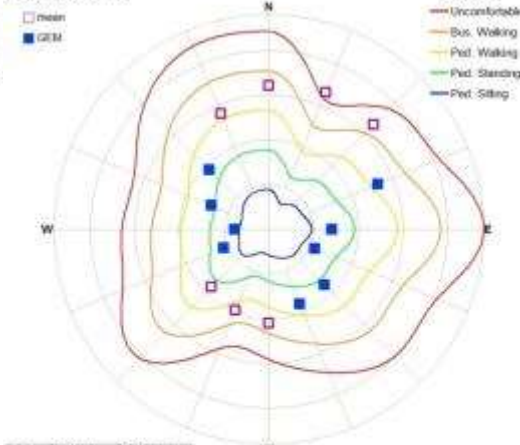
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.0	30.9
4.0	2.0	1.1
6.0	0.2	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.7	N/A	Ped. Sitting
7.0	0.012	Pass
1.0	Ped. Standing	N/A
6.2	Pass	0.012

LOCATION 9



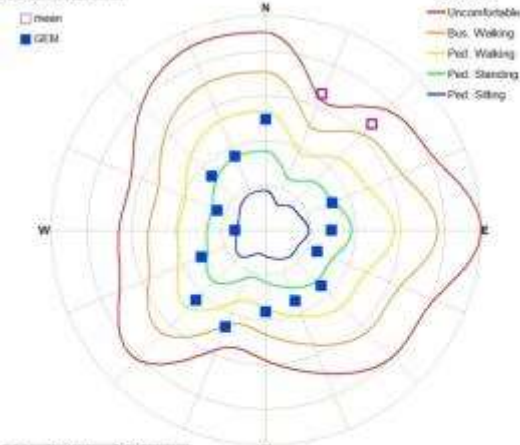
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	25.1	36.4
4.0	3.6	4.9
6.0	1.2	1.8
8.0	0.0	0.0
10.0	0.0	0.0
11.0	5.8	Ped. Sitting
12.0	0.012	Pass
13.0	Ped. Sitting	5.8
14.0	Pass	0.012

LOCATION 10



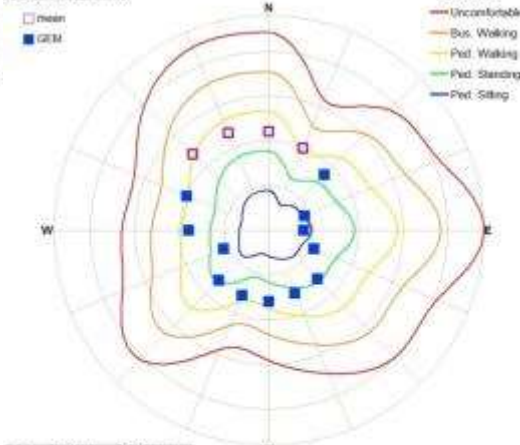
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	39.7	47.4
4.0	20.4	24.2
6.0	6.4	8.2
8.0	2.0	2.5
10.0	0.7	0.9
11.0	5.8	Ped. Walking
12.0	0.012	Pass
13.0	Ped. Walking	5.8
14.0	Pass	0.012

LOCATION 11



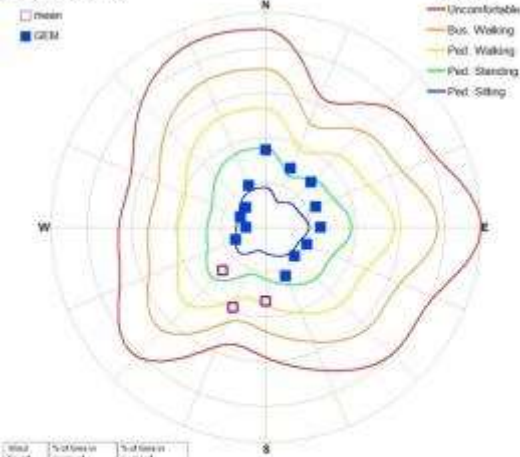
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	17.8	10.4
4.0	21.3	22.0
6.0	2.7	4.2
8.0	2.7	4.2
10.0	0.6	1.2
11.0	5.8	Ped. Walking
12.0	0.012	Pass
13.0	Ped. Walking	5.8
14.0	Pass	0.012

LOCATION 12



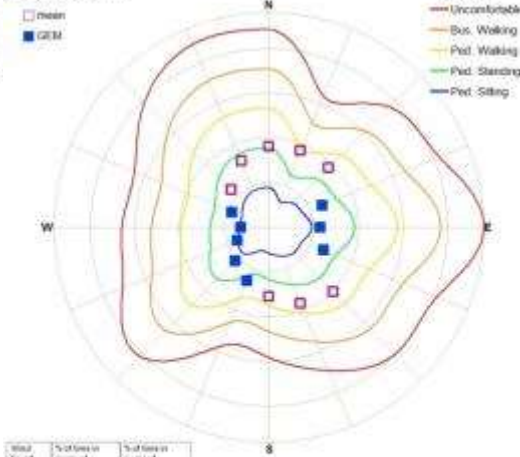
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	36.4	36.4
4.0	21.3	21.3
6.0	1.9	1.6
8.0	0.2	0.2
10.0	0.0	0.0
11.0	5.8	Ped. Standing
12.0	0.012	Pass
13.0	Ped. Standing	5.8
14.0	Pass	0.012

LOCATION 13



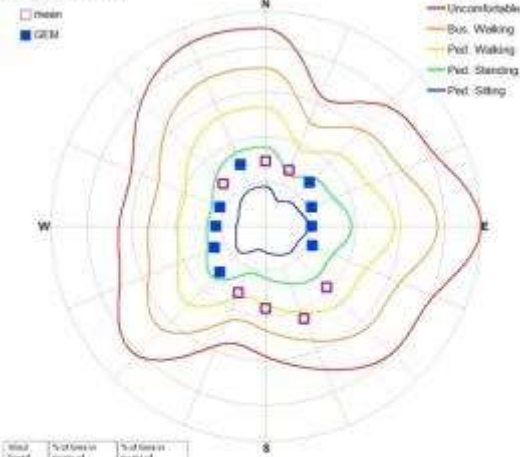
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	28.7	33.3
4.0	7.3	6.9
6.0	2.9	2.6
8.0	0.1	0.0
10.0	0.0	0.0
4.0	N/A	Ped. Standing
6.0	0.012	Ped.
8.0	Ped. Standing	N/A
10.0	Ped.	0.012

LOCATION 14



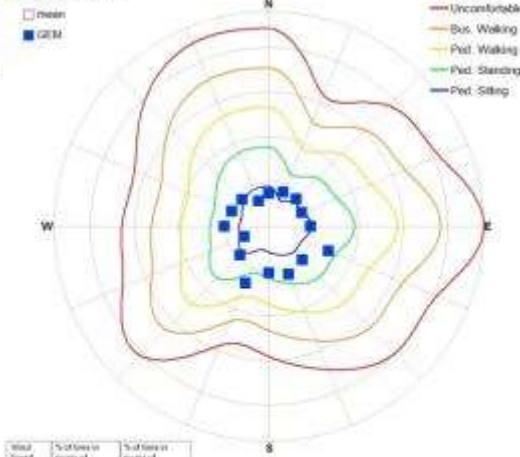
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.8	47.3
4.0	20.1	7.7
6.0	8.8	0.8
8.0	0.0	0.0
10.0	0.0	0.0
4.0	N/A	Ped. Standing
6.0	0.012	Ped.
8.0	Ped. Standing	N/A
10.0	Ped.	0.012

LOCATION 15



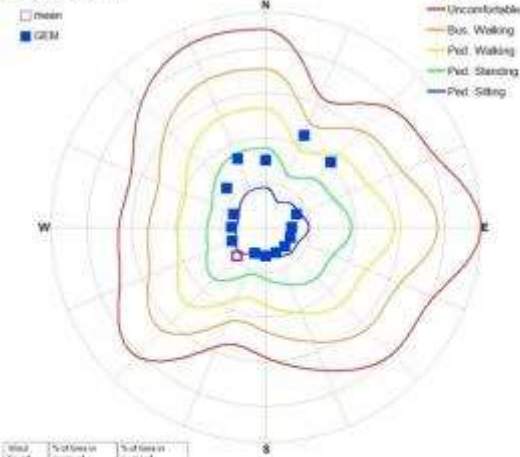
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	47.8	41.3
4.0	11.7	7.7
6.0	1.3	0.5
8.0	0.1	0.0
10.0	0.0	0.0
4.0	N/A	Ped. Standing
6.0	0.012	Ped.
8.0	Ped. Standing	N/A
10.0	Ped.	0.012

LOCATION 16



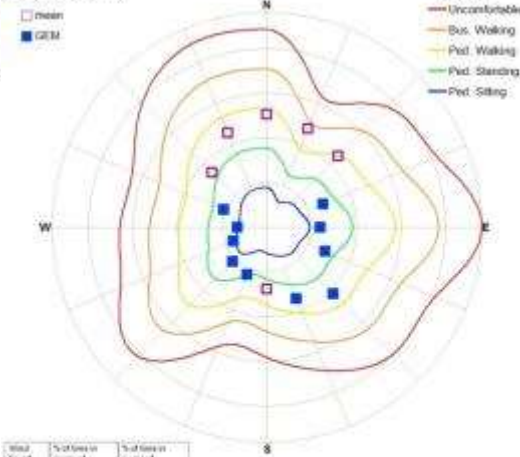
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.6	73.8
4.0	24.0	11.1
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
4.0	N/A	Ped. Sitting
6.0	0.012	Ped.
8.0	Ped. Sitting	N/A
10.0	Ped.	0.012

LOCATION 17



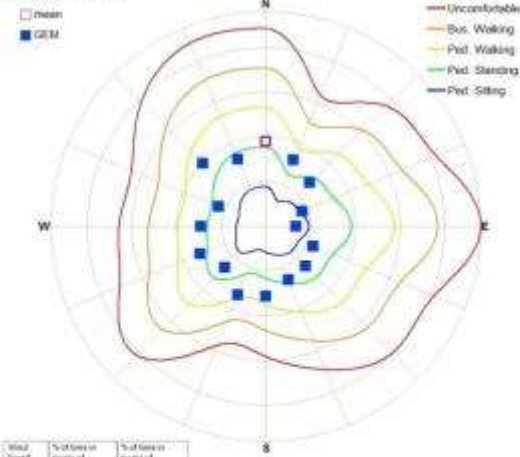
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.1	71.0
4.0	2.0	5.3
6.0	0.2	1.2
8.0	0.0	0.1
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
7.0	0.012	Pass
4.0	Ped. Standing	5.8
6.7	Pass	0.012

LOCATION 18



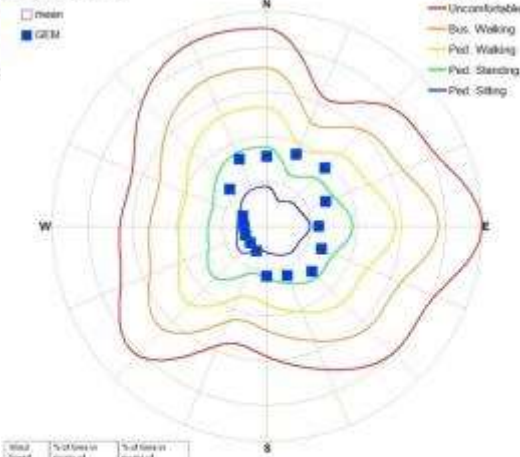
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	67.8	60.1
4.0	10.1	11.1
6.0	2.6	1.5
8.0	0.3	0.1
10.0	0.0	0.0
1.0	N/A	Ped. Standing
6.7	0.012	Pass
4.7	Ped. Standing	5.8
5.6	Pass	0.012

LOCATION 19



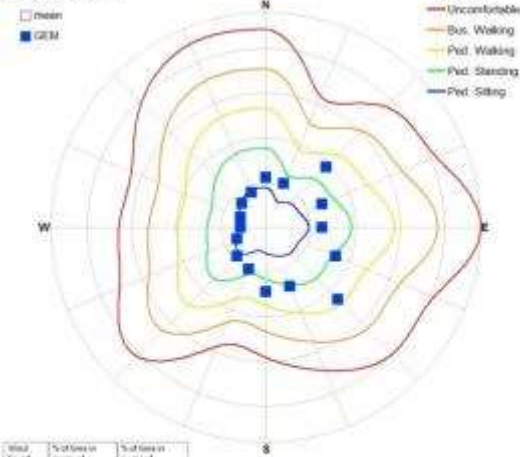
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	68.1	60.9
4.0	1.2	6.7
6.0	0.2	0.3
8.0	0.0	0.1
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
7.0	0.012	Pass
4.0	Ped. Standing	5.8
6.0	Pass	0.012

LOCATION 20



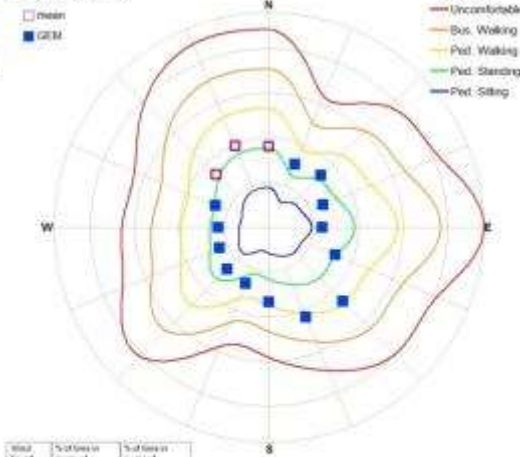
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.0	61.2
4.0	1.7	4.0
6.0	0.0	0.2
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
6.0	0.012	Pass
1.8	Ped. Sitting	5.8
6.0	Pass	0.012

LOCATION 21



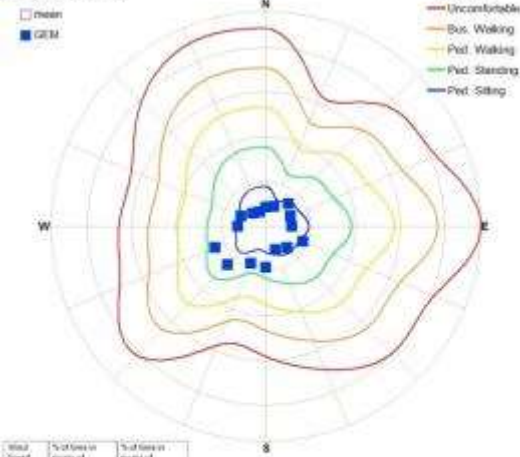
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	25.0	11.3
4.8	1.0	1.7
6.8	0.1	0.3
8.8	0.0	0.0
10.0	0.0	0.0
12.0	N/A	Ped. Sitting
17.1	0.012	Pass
4.1	Ped. Standing	N/A
7.7	Pass	0.012

LOCATION 22



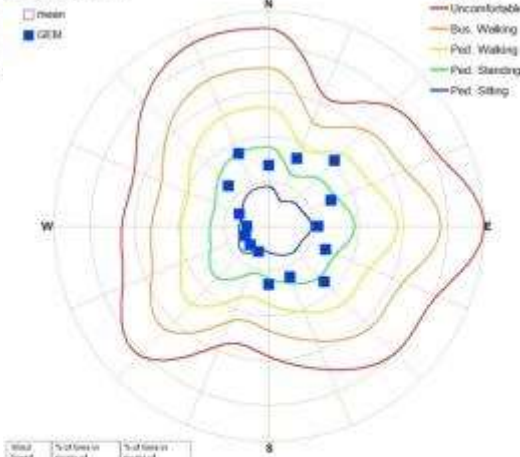
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	42.8	12.9
4.8	8.0	12.7
6.8	2.5	1.2
8.8	0.0	0.1
10.0	0.0	0.0
12.0	N/A	Ped. Standing
16.0	0.012	Pass
4.9	Ped. Standing	N/A
9.2	Pass	0.012

LOCATION 23



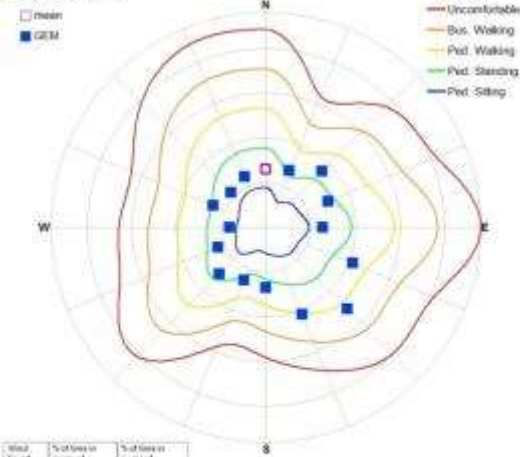
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	5.0	11.4
4.8	0.5	0.2
6.8	0.0	0.0
8.8	0.0	0.0
10.0	0.0	0.0
12.0	N/A	Ped. Sitting
17.1	0.012	Pass
2.0	Ped. Standing	N/A
4.0	Pass	0.012

LOCATION 24



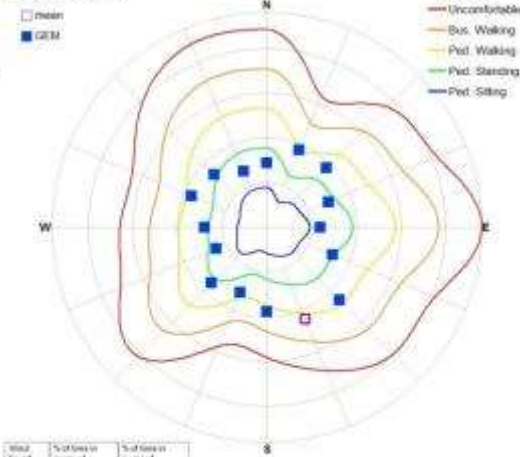
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	25.8	10.8
4.8	1.5	1.7
6.8	0.0	0.0
8.8	0.0	0.0
10.0	0.0	0.0
12.0	N/A	Ped. Sitting
16.0	0.012	Pass
4.1	Ped. Standing	N/A
7.2	Pass	0.012

LOCATION 25



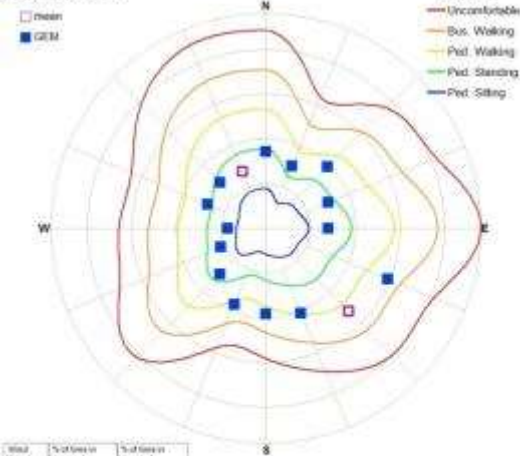
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	14.4	11.9
4.0	4.0	3.6
6.0	1.6	1.6
8.0	0.0	0.1
10.0	0.0	0.0
12.0	0.0	0.0
14.0	0.0	0.0
16.0	0.0	0.0
18.0	0.0	0.0
20.0	0.0	0.0
22.0	0.0	0.0
24.0	0.0	0.0
26.0	0.0	0.0
28.0	0.0	0.0
30.0	0.0	0.0
32.0	0.0	0.0
34.0	0.0	0.0
36.0	0.0	0.0
38.0	0.0	0.0
40.0	0.0	0.0
42.0	0.0	0.0
44.0	0.0	0.0
46.0	0.0	0.0
48.0	0.0	0.0
50.0	0.0	0.0
52.0	0.0	0.0
54.0	0.0	0.0
56.0	0.0	0.0
58.0	0.0	0.0
60.0	0.0	0.0
62.0	0.0	0.0
64.0	0.0	0.0
66.0	0.0	0.0
68.0	0.0	0.0
70.0	0.0	0.0
72.0	0.0	0.0
74.0	0.0	0.0
76.0	0.0	0.0
78.0	0.0	0.0
80.0	0.0	0.0
82.0	0.0	0.0
84.0	0.0	0.0
86.0	0.0	0.0
88.0	0.0	0.0
90.0	0.0	0.0
92.0	0.0	0.0
94.0	0.0	0.0
96.0	0.0	0.0
98.0	0.0	0.0
100.0	0.0	0.0

LOCATION 26



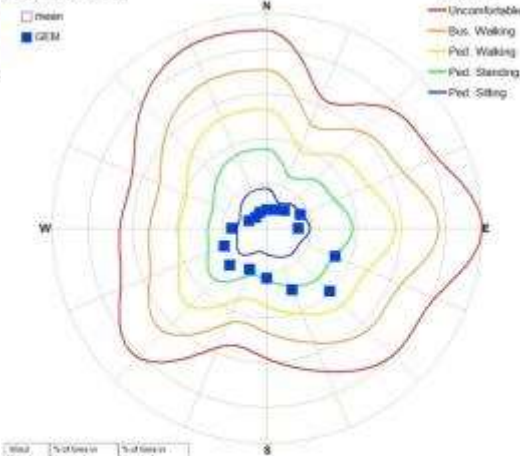
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	20.0	17.4
4.0	10.7	10.2
6.0	3.2	2.5
8.0	0.1	0.1
10.0	0.0	0.0
12.0	0.0	0.0
14.0	0.0	0.0
16.0	0.0	0.0
18.0	0.0	0.0
20.0	0.0	0.0
22.0	0.0	0.0
24.0	0.0	0.0
26.0	0.0	0.0
28.0	0.0	0.0
30.0	0.0	0.0
32.0	0.0	0.0
34.0	0.0	0.0
36.0	0.0	0.0
38.0	0.0	0.0
40.0	0.0	0.0
42.0	0.0	0.0
44.0	0.0	0.0
46.0	0.0	0.0
48.0	0.0	0.0
50.0	0.0	0.0
52.0	0.0	0.0
54.0	0.0	0.0
56.0	0.0	0.0
58.0	0.0	0.0
60.0	0.0	0.0
62.0	0.0	0.0
64.0	0.0	0.0
66.0	0.0	0.0
68.0	0.0	0.0
70.0	0.0	0.0
72.0	0.0	0.0
74.0	0.0	0.0
76.0	0.0	0.0
78.0	0.0	0.0
80.0	0.0	0.0
82.0	0.0	0.0
84.0	0.0	0.0
86.0	0.0	0.0
88.0	0.0	0.0
90.0	0.0	0.0
92.0	0.0	0.0
94.0	0.0	0.0
96.0	0.0	0.0
98.0	0.0	0.0
100.0	0.0	0.0

LOCATION 27



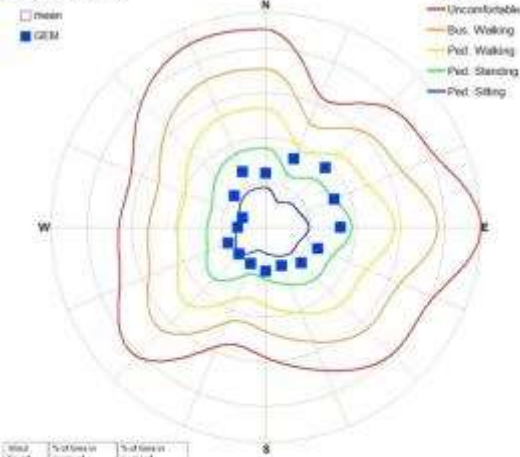
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	45.1	31.4
4.0	12.7	10.5
6.0	1.8	1.6
8.0	0.2	0.1
10.0	0.0	0.0
12.0	0.0	0.0
14.0	0.0	0.0
16.0	0.0	0.0
18.0	0.0	0.0
20.0	0.0	0.0
22.0	0.0	0.0
24.0	0.0	0.0
26.0	0.0	0.0
28.0	0.0	0.0
30.0	0.0	0.0
32.0	0.0	0.0
34.0	0.0	0.0
36.0	0.0	0.0
38.0	0.0	0.0
40.0	0.0	0.0
42.0	0.0	0.0
44.0	0.0	0.0
46.0	0.0	0.0
48.0	0.0	0.0
50.0	0.0	0.0
52.0	0.0	0.0
54.0	0.0	0.0
56.0	0.0	0.0
58.0	0.0	0.0
60.0	0.0	0.0
62.0	0.0	0.0
64.0	0.0	0.0
66.0	0.0	0.0
68.0	0.0	0.0
70.0	0.0	0.0
72.0	0.0	0.0
74.0	0.0	0.0
76.0	0.0	0.0
78.0	0.0	0.0
80.0	0.0	0.0
82.0	0.0	0.0
84.0	0.0	0.0
86.0	0.0	0.0
88.0	0.0	0.0
90.0	0.0	0.0
92.0	0.0	0.0
94.0	0.0	0.0
96.0	0.0	0.0
98.0	0.0	0.0
100.0	0.0	0.0

LOCATION 28



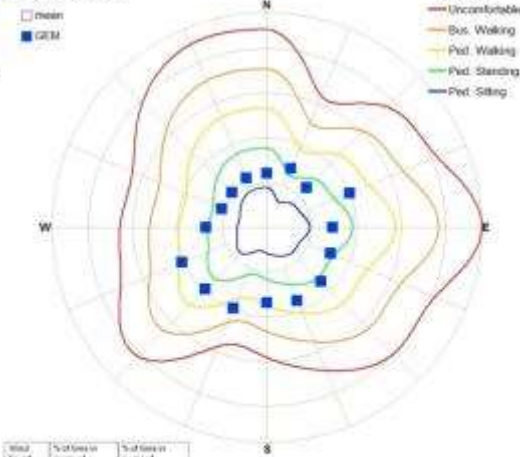
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.8	52.7
4.0	16.3	12.4
6.0	0.0	0.1
8.0	0.0	0.0
10.0	0.0	0.0
12.0	0.0	0.0
14.0	0.0	0.0
16.0	0.0	0.0
18.0	0.0	0.0
20.0	0.0	0.0
22.0	0.0	0.0
24.0	0.0	0.0
26.0	0.0	0.0
28.0	0.0	0.0
30.0	0.0	0.0
32.0	0.0	0.0
34.0	0.0	0.0
36.0	0.0	0.0
38.0	0.0	0.0
40.0	0.0	0.0
42.0	0.0	0.0
44.0	0.0	0.0
46.0	0.0	0.0
48.0	0.0	0.0
50.0	0.0	0.0
52.0	0.0	0.0
54.0	0.0	0.0
56.0	0.0	0.0
58.0	0.0	0.0
60.0	0.0	0.0
62.0	0.0	0.0
64.0	0.0	0.0
66.0	0.0	0.0
68.0	0.0	0.0
70.0	0.0	0.0
72.0	0.0	0.0
74.0	0.0	0.0
76.0	0.0	0.0
78.0	0.0	0.0
80.0	0.0	0.0
82.0	0.0	0.0
84.0	0.0	0.0
86.0	0.0	0.0
88.0	0.0	0.0
90.0	0.0	0.0
92.0	0.0	0.0
94.0	0.0	0.0
96.0	0.0	0.0
98.0	0.0	0.0
100.0	0.0	0.0

LOCATION 29



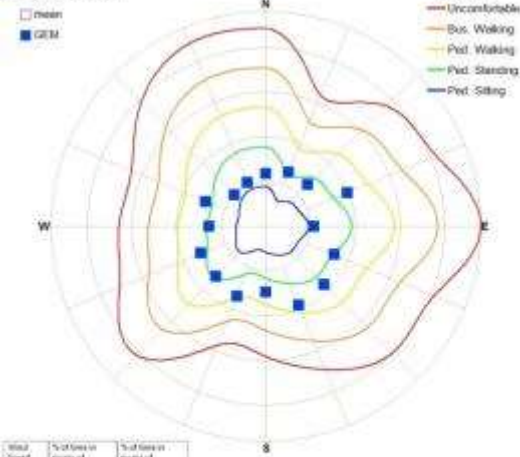
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	26.8	11.7
4.0	13.7	5.5
6.0	10.0	4.1
8.0	6.0	3.0
10.0	3.0	1.0
15.0	0.0	0.0
1.0	0.0	0.0
2.0	0.0	0.0
3.0	0.0	0.0
4.0	0.0	0.0
5.0	0.0	0.0
6.0	0.0	0.0
7.0	0.0	0.0
8.0	0.0	0.0
9.0	0.0	0.0
10.0	0.0	0.0
11.0	0.0	0.0
12.0	0.0	0.0
13.0	0.0	0.0
14.0	0.0	0.0
15.0	0.0	0.0
16.0	0.0	0.0
17.0	0.0	0.0
18.0	0.0	0.0
19.0	0.0	0.0
20.0	0.0	0.0
21.0	0.0	0.0
22.0	0.0	0.0
23.0	0.0	0.0
24.0	0.0	0.0
25.0	0.0	0.0
26.0	0.0	0.0
27.0	0.0	0.0
28.0	0.0	0.0
29.0	0.0	0.0
30.0	0.0	0.0
31.0	0.0	0.0
32.0	0.0	0.0
33.0	0.0	0.0
34.0	0.0	0.0
35.0	0.0	0.0
36.0	0.0	0.0
37.0	0.0	0.0
38.0	0.0	0.0
39.0	0.0	0.0
40.0	0.0	0.0
41.0	0.0	0.0
42.0	0.0	0.0
43.0	0.0	0.0
44.0	0.0	0.0
45.0	0.0	0.0
46.0	0.0	0.0
47.0	0.0	0.0
48.0	0.0	0.0
49.0	0.0	0.0
50.0	0.0	0.0
51.0	0.0	0.0
52.0	0.0	0.0
53.0	0.0	0.0
54.0	0.0	0.0
55.0	0.0	0.0
56.0	0.0	0.0
57.0	0.0	0.0
58.0	0.0	0.0
59.0	0.0	0.0
60.0	0.0	0.0
61.0	0.0	0.0
62.0	0.0	0.0
63.0	0.0	0.0
64.0	0.0	0.0
65.0	0.0	0.0
66.0	0.0	0.0
67.0	0.0	0.0
68.0	0.0	0.0
69.0	0.0	0.0
70.0	0.0	0.0
71.0	0.0	0.0
72.0	0.0	0.0
73.0	0.0	0.0
74.0	0.0	0.0
75.0	0.0	0.0
76.0	0.0	0.0
77.0	0.0	0.0
78.0	0.0	0.0
79.0	0.0	0.0
80.0	0.0	0.0
81.0	0.0	0.0
82.0	0.0	0.0
83.0	0.0	0.0
84.0	0.0	0.0
85.0	0.0	0.0
86.0	0.0	0.0
87.0	0.0	0.0
88.0	0.0	0.0
89.0	0.0	0.0
90.0	0.0	0.0
91.0	0.0	0.0
92.0	0.0	0.0
93.0	0.0	0.0
94.0	0.0	0.0
95.0	0.0	0.0
96.0	0.0	0.0
97.0	0.0	0.0
98.0	0.0	0.0
99.0	0.0	0.0
100.0	0.0	0.0

LOCATION 30



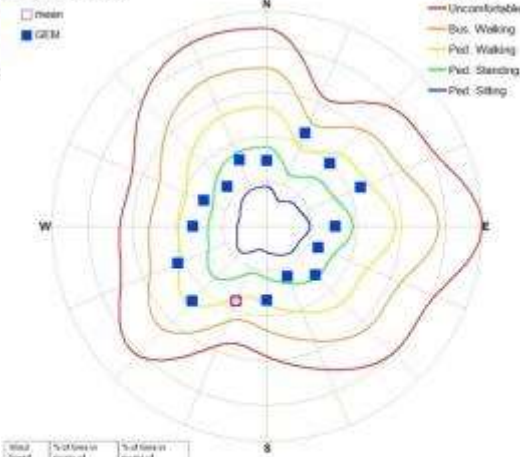
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	20.7	10.2
4.0	12.6	12.7
6.0	8.1	1.0
8.0	5.0	0.1
10.0	3.0	0.0
15.0	0.0	0.0
1.0	0.0	0.0
2.0	0.0	0.0
3.0	0.0	0.0
4.0	0.0	0.0
5.0	0.0	0.0
6.0	0.0	0.0
7.0	0.0	0.0
8.0	0.0	0.0
9.0	0.0	0.0
10.0	0.0	0.0
11.0	0.0	0.0
12.0	0.0	0.0
13.0	0.0	0.0
14.0	0.0	0.0
15.0	0.0	0.0
16.0	0.0	0.0
17.0	0.0	0.0
18.0	0.0	0.0
19.0	0.0	0.0
20.0	0.0	0.0
21.0	0.0	0.0
22.0	0.0	0.0
23.0	0.0	0.0
24.0	0.0	0.0
25.0	0.0	0.0
26.0	0.0	0.0
27.0	0.0	0.0
28.0	0.0	0.0
29.0	0.0	0.0
30.0	0.0	0.0
31.0	0.0	0.0
32.0	0.0	0.0
33.0	0.0	0.0
34.0	0.0	0.0
35.0	0.0	0.0
36.0	0.0	0.0
37.0	0.0	0.0
38.0	0.0	0.0
39.0	0.0	0.0
40.0	0.0	0.0
41.0	0.0	0.0
42.0	0.0	0.0
43.0	0.0	0.0
44.0	0.0	0.0
45.0	0.0	0.0
46.0	0.0	0.0
47.0	0.0	0.0
48.0	0.0	0.0
49.0	0.0	0.0
50.0	0.0	0.0
51.0	0.0	0.0
52.0	0.0	0.0
53.0	0.0	0.0
54.0	0.0	0.0
55.0	0.0	0.0
56.0	0.0	0.0
57.0	0.0	0.0
58.0	0.0	0.0
59.0	0.0	0.0
60.0	0.0	0.0
61.0	0.0	0.0
62.0	0.0	0.0
63.0	0.0	0.0
64.0	0.0	0.0
65.0	0.0	0.0
66.0	0.0	0.0
67.0	0.0	0.0
68.0	0.0	0.0
69.0	0.0	0.0
70.0	0.0	0.0
71.0	0.0	0.0
72.0	0.0	0.0
73.0	0.0	0.0
74.0	0.0	0.0
75.0	0.0	0.0
76.0	0.0	0.0
77.0	0.0	0.0
78.0	0.0	0.0
79.0	0.0	0.0
80.0	0.0	0.0
81.0	0.0	0.0
82.0	0.0	0.0
83.0	0.0	0.0
84.0	0.0	0.0
85.0	0.0	0.0
86.0	0.0	0.0
87.0	0.0	0.0
88.0	0.0	0.0
89.0	0.0	0.0
90.0	0.0	0.0
91.0	0.0	0.0
92.0	0.0	0.0
93.0	0.0	0.0
94.0	0.0	0.0
95.0	0.0	0.0
96.0	0.0	0.0
97.0	0.0	0.0
98.0	0.0	0.0
99.0	0.0	0.0
100.0	0.0	0.0

LOCATION 31

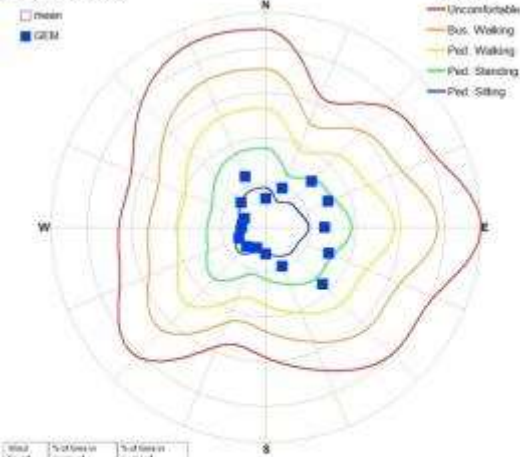


Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	20.0	17.2
4.0	12.0	6.1
6.0	8.1	6.6
8.0	5.0	5.0
10.0	3.0	5.0
15.0	0.0	0.0
1.0	0.0	0.0
2.0	0.0	0.0
3.0	0.0	0.0
4.0	0.0	0.0
5.0	0.0	0.0
6.0	0.0	0.0
7.0	0.0	0.0
8.0	0.0	0.0
9.0	0.0	0.0
10.0	0.0	0.0
11.0	0.0	0.0
12.0	0.0	0.0
13.0	0.0	0.0
14.0	0.0	0.0
15.0	0.0	0.0
16.0	0.0	0.0
17.0	0.0	0.0
18.0	0.0	0.0
19.0	0.0	0.0
20.0	0.0	0.0
21.0	0.0	0.0
22.0	0.0	0.0
23.0	0.0	0.0
24.0	0.0	0.0
25.0	0.0	0.0
26.0	0.0	0.0
27.0	0.0	0.0
28.0	0.0	0.0
29.0	0.0	0.0
30.0	0.0	0.0
31.0	0.0	0.0
32.0	0.0	0.0
33.0	0.0	0.0
34.0	0.0	0.0
35.0	0.0	0.0
36.0	0.0	0.0
37.0	0.0	0.0
38.0	0.0	0.0
39.0	0.0	0.0
40.0	0.0	0.0
41.0	0.0	0.0
42.0	0.0	0.0
43.0	0.0	0.0
44.0	0.0	0.0
45.0	0.0	0.0
46.0	0.0	0.0
47.0	0.0	0.0
48.0	0.0	0.0
49.0	0.0	0.0
50.0	0.0	0.0
51.0	0.0	0.0
52.0	0.0	0.0
53.0	0.0	0.0
54.0	0.0	0.0
55.0	0.0	0.0
56.0	0.0	0.0
57.0	0.0	0.0
58.0	0.0	0.0
59.0	0.0	0.0
60.0	0.0	0.0
61.0	0.0	0.0
62.0	0.0	0.0
63.0	0.0	0.0
64.0	0.0	0.0
65.0	0.0	0.0
66.0	0.0	0.0
67.0	0.0	0.0
68.0	0.0	0.0
69.0	0.0	0.0
70.0	0.0	0.0
71.0	0.0	0.0
72.0	0.0	0.0
73.0	0.0	0.0
74.0	0.0	0.0
75.0	0.0	0.0
76.0	0.0	0.0
77.0	0.0	0.0
78.0	0.0	0.0
79.0	0.0	0.0
80.0	0.0	0.0
81.0	0.0	0.0
82.0	0.0	0.0
83.0	0.0	0.0
84.0	0.0	0.0
85.0	0.0	0.0
86.0	0.0	0.0
87.0	0.0	0.0
88.0	0.0	0.0
89.0	0.0	0.0
90.0	0.0	0.0
91.0	0.0	0.0
92.0	0.0	0.0
93.0	0.0	0.0
94.0	0.0	0.0
95.0	0.0	0.0
96.0	0.0	0.0
97.0	0.0	0.0
98.0	0.0	0.0
99.0	0.0	0.0
100.0	0.0	0.0

LOCATION 32

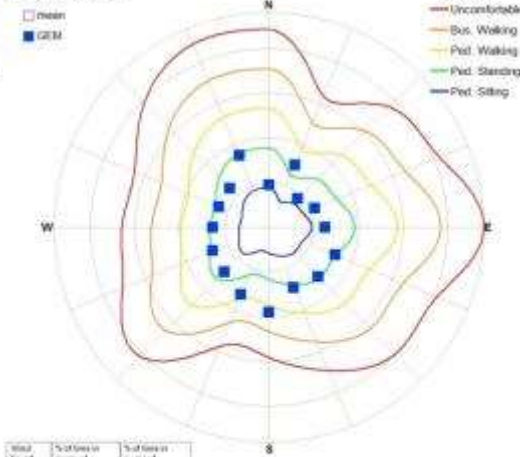


LOCATION 33



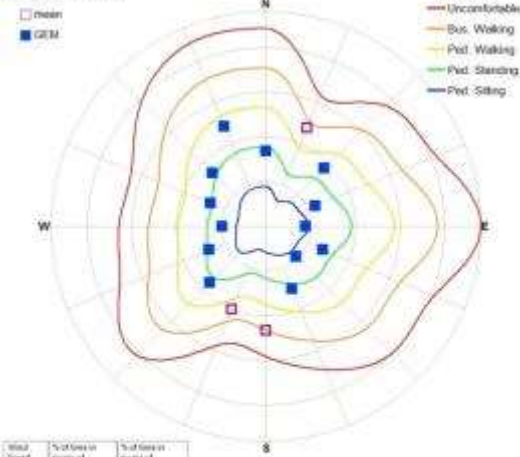
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	47	10.4
4.0	11.1	0.9
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
11.0	5.8	Outdoor Sitting
12.0	0.012	Pace
13.0	Ped. Sitting	5.8
14.0	Pace	0.012

LOCATION 34



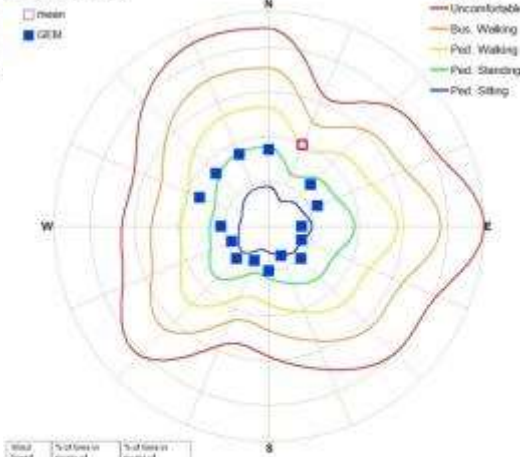
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.8	44.7
4.0	4.3	0.8
6.0	0.2	1.6
8.0	0.0	0.1
10.0	0.0	0.0
11.0	5.8	Ped. Sitting
12.0	0.012	Pace
13.0	Ped. Standing	5.8
14.0	Pace	0.012

LOCATION 35



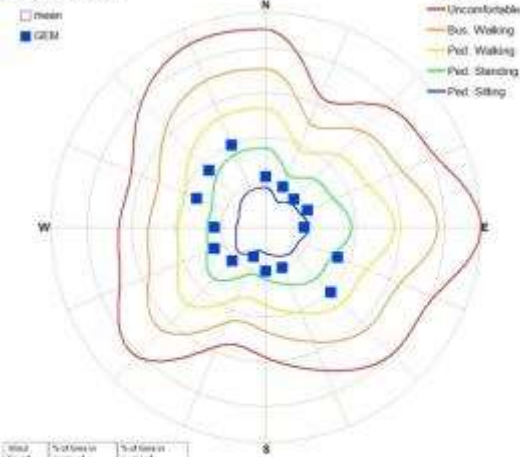
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	47.0	10.1
4.0	11.1	1.0
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
11.0	5.8	Ped. Walking
12.0	0.012	Pace
13.0	Ped. Standing	5.8
14.0	Pace	0.012

LOCATION 36



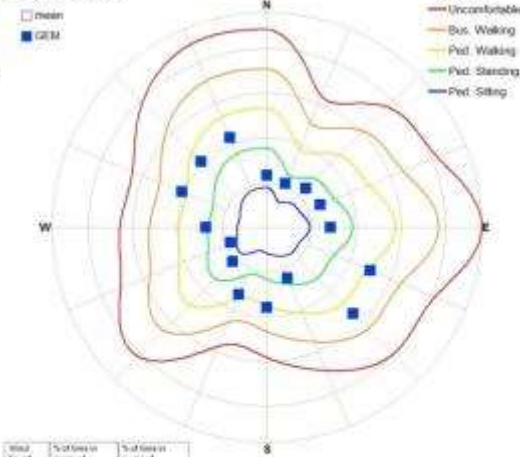
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.8	44.7
4.0	4.3	0.8
6.0	0.2	1.6
8.0	0.0	0.1
10.0	0.0	0.0
11.0	5.8	Ped. Sitting
12.0	0.012	Pace
13.0	Ped. Standing	5.8
14.0	Pace	0.012

LOCATION 37



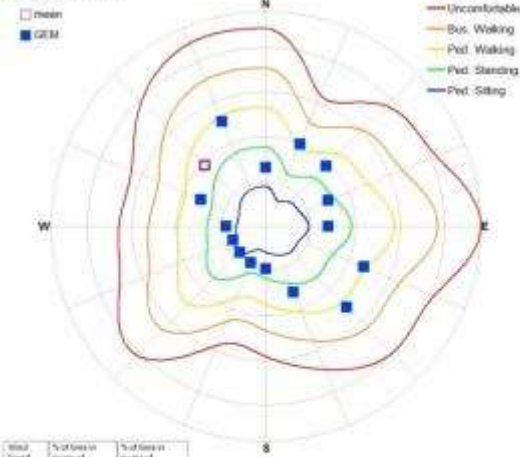
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.8	77.3
4.0	1.0	0.3
6.0	0.1	0.0
8.0	0.0	0.0
10.0	0.0	0.0
12.0	N/A	Ped. Sitting
15.0	0.012	Pass
20.0	Ped. Sitting	N/A
25.0	Pass	0.012

LOCATION 38



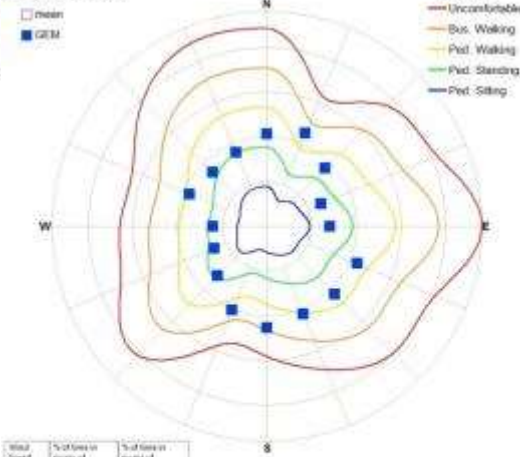
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	79.2	79.4
4.0	5.5	1.8
6.0	0.8	0.0
8.0	0.1	0.0
10.0	0.0	0.0
12.0	N/A	Ped. Standing
15.0	0.012	Pass
20.0	Ped. Standing	N/A
25.0	Pass	0.012

LOCATION 39



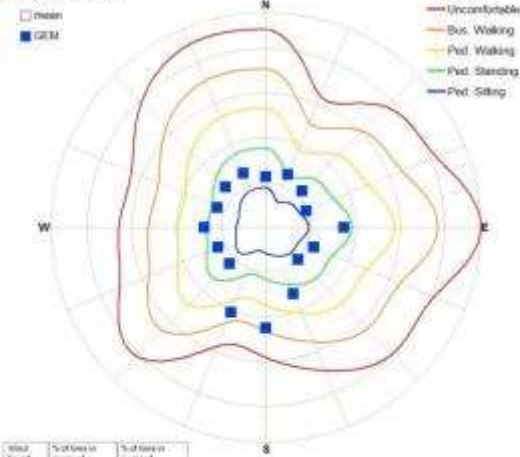
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	70.3	69.2
4.0	0.5	0.2
6.0	0.0	0.0
8.0	0.1	0.1
10.0	0.0	0.0
12.0	N/A	Ped. Standing
15.0	0.012	Pass
20.0	Ped. Standing	N/A
25.0	Pass	0.012

LOCATION 40



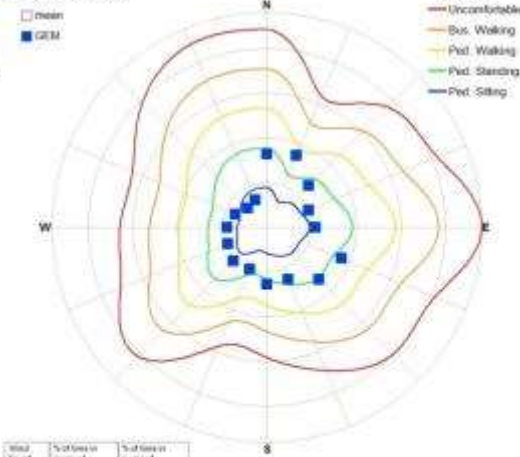
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.1	69.8
4.0	17.6	22.7
6.0	2.7	0.9
8.0	0.4	0.0
10.0	0.0	0.0
12.0	N/A	Ped. Standing
15.0	0.012	Pass
20.0	Ped. Walking	N/A
25.0	Pass	0.012

LOCATION 41



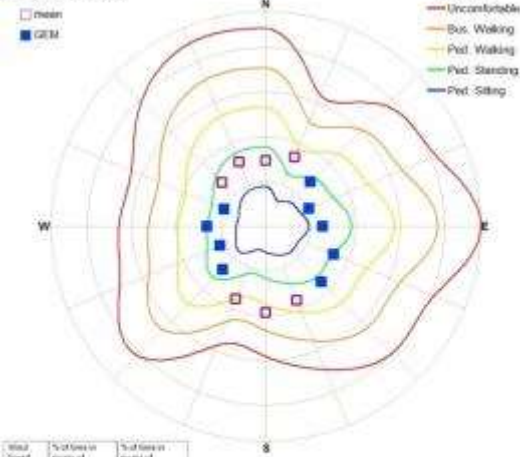
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	20.1	41.1
4.0	20.7	14.1
6.0	2.5	1.0
8.0	0.2	0.6
10.0	0.0	0.1
1.0	N.A	Ped. Standing
2.0	0.012	Pass
3.0	Ped. Standing	5.8
11.0	Pass	0.012

LOCATION 42



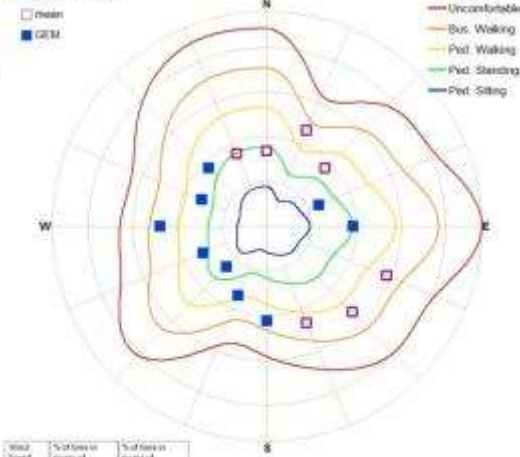
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	20.8	17.5
4.0	21	4.1
6.0	0.0	0.2
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N.A	Ped. Sitting
2.0	0.012	Pass
3.0	Ped. Sitting	5.8
11.0	Pass	0.012

LOCATION 43



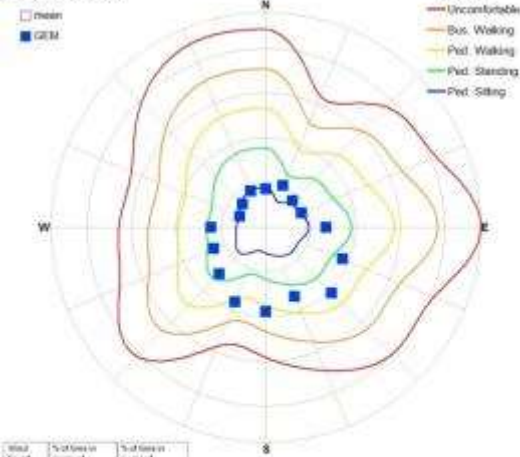
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	47.8	81.7
4.0	17.2	11.8
6.0	1.8	1.6
8.0	0.1	0.1
10.0	0.0	0.0
1.0	N.A	Ped. Standing
2.0	0.012	Pass
3.0	Ped. Standing	5.8
11.0	Pass	0.012

LOCATION 44



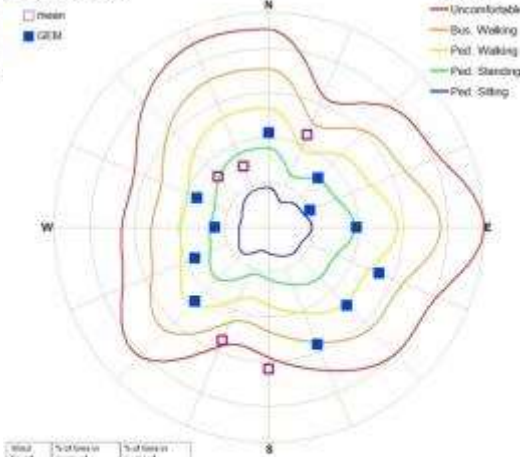
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	51.2	83.8
4.0	21.8	25.2
6.0	4.0	1.8
8.0	0.5	0.1
10.0	0.0	0.1
1.0	N.A	Ped. Standing
2.0	0.012	Pass
3.0	Ped. Walking	5.8
11.0	Pass	0.012

LOCATION 45



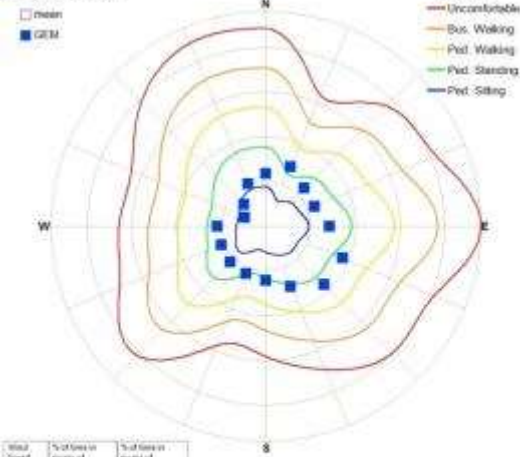
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	25.0	99.0
4.0	4.0	22.0
6.0	2.2	1.0
8.0	0.0	0.1
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
1.1	0.012	Ped.
4.0	Ped. Standing	5.0
9.0	Ped.	0.012

LOCATION 46



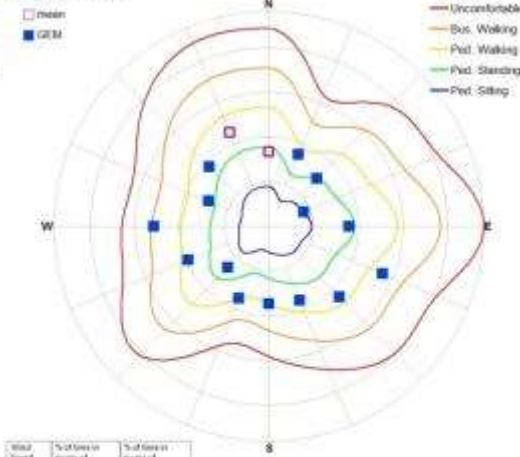
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	30.0	64.0
4.0	20.0	28.0
6.0	12.0	11.0
8.0	4.0	1.0
10.0	1.0	0.0
1.0	N/A	Ped. Sitting
1.1	0.012	(GEM) Ped.
7.0	Ped. Walking	5.0
14.0	Ped.	0.012

LOCATION 47



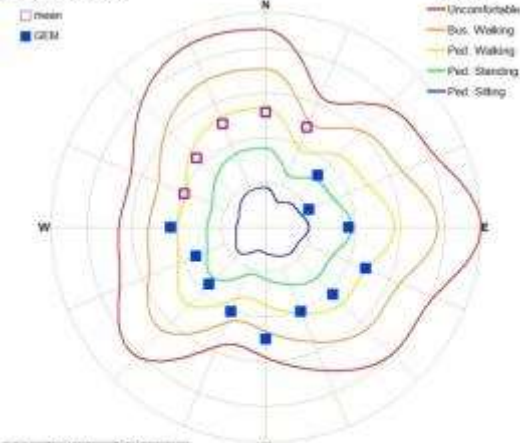
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	21.0	99.4
4.0	0.0	0.0
6.0	0.0	0.1
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
1.1	0.012	Ped.
1.0	Ped. Standing	5.0
6.7	Ped.	0.012

LOCATION 48



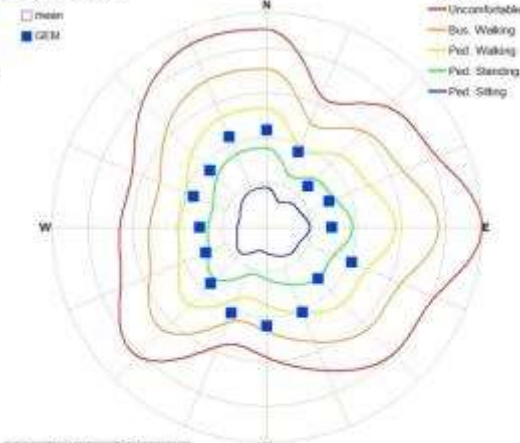
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	32.0	65.0
4.0	17.0	20.0
6.0	1.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
4.0	N/A	Ped. Standing
6.0	0.012	Ped.
1.0	Ped. Standing	5.0
11.0	Ped.	0.012

LOCATION 49



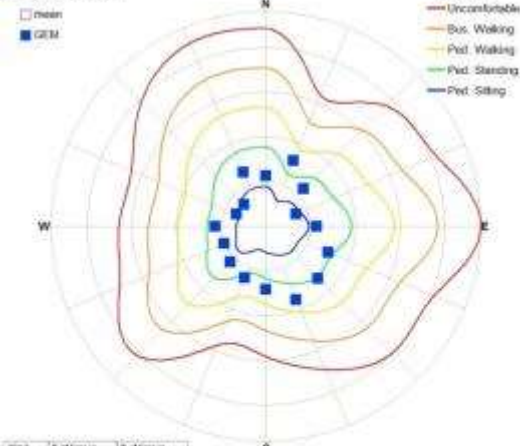
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	67.4	77.7
4.8	24.0	29.4
6.8	7.7	6.6
8.8	2.5	2.6
10.0	0.2	0.2
6.5	5.8	Ped. Walking
12.3	0.812	Pass
6.6	Ped. walking	5.8
12.2	Pass	0.812

LOCATION 50



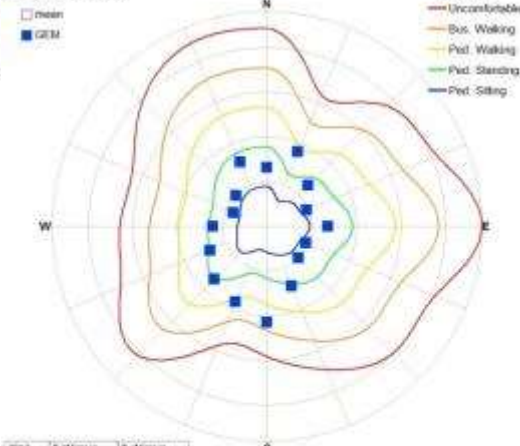
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	49.2	64.9
4.8	23.8	20.2
6.8	2.3	1.6
8.8	0.2	0.6
10.0	0.0	0.0
5.2	5.8	Ped. Standing
9.8	0.812	Pass
9.8	Ped. Standing	5.8
11.8	Pass	0.812

LOCATION 51



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	24.1	50.8
4.8	3.6	6.0
6.8	0.0	0.2
8.8	0.0	0.0
10.0	0.0	0.0
3.1	5.8	Ped. Sitting
5.0	0.812	Pass
4.1	Ped. Standing	5.8
7.5	Pass	0.812

LOCATION 52

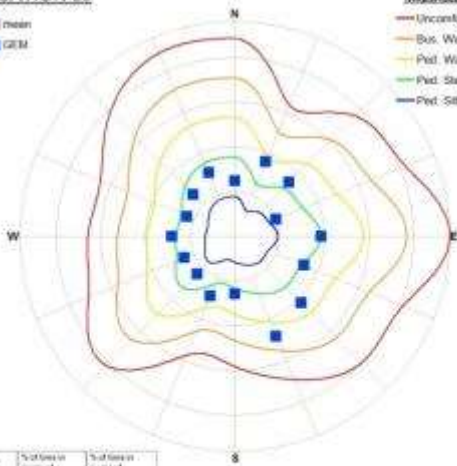


Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	27.7	55.4
4.8	5.6	10.9
6.8	0.3	2.8
8.8	0.0	0.2
10.0	0.0	0.0
4.3	5.8	Ped. Standing
7.6	0.812	Pass
7.1	Ped. Standing	5.8
10.4	Pass	0.812

LOCATION 53

□ mean
■ GEM

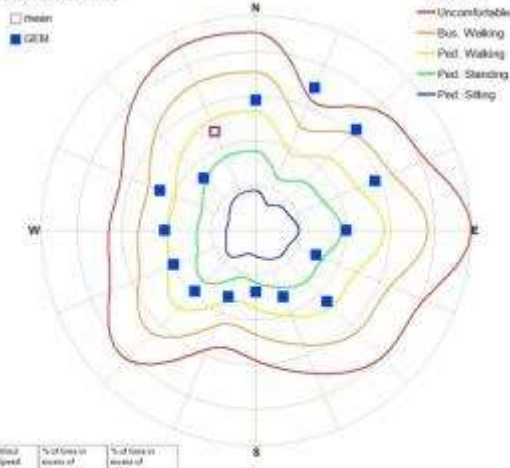
THRESHOLD
 --- Uncomfortable
 --- Bus. Walking
 --- Ped. Walking
 --- Ped. Standing
 --- Ped. Sitting



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	20.4	30.2
4.8	1.7	20.8
6.8	0.1	1.8
8.8	0.0	0.1
10.0	0.0	0.0
1.4	N.A.	Ped. Sitting
0.7	0.022	Pass
4.8	Ped. Standing	5.8
9.8	Pass	0.022

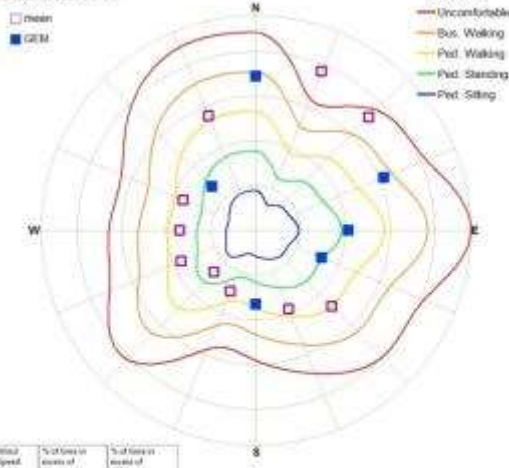
Appendix 3: Directional Wind Results for Configuration B

LOCATION 1.1



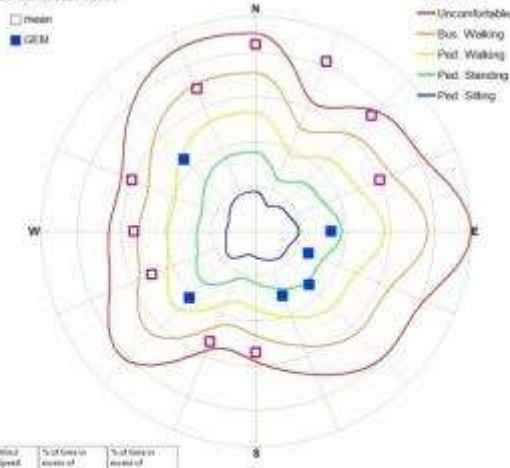
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	40.0	75.1
4.0	36.3	26.3
6.0	25.5	8.3
8.0	1.9	2.8
10.0	0.4	0.0
6.1	5.8	Ped. Walking
10.3	0.012	Pass
6.0	Ped. Walking	5.8
10.4	Pass	0.012

LOCATION 2.1



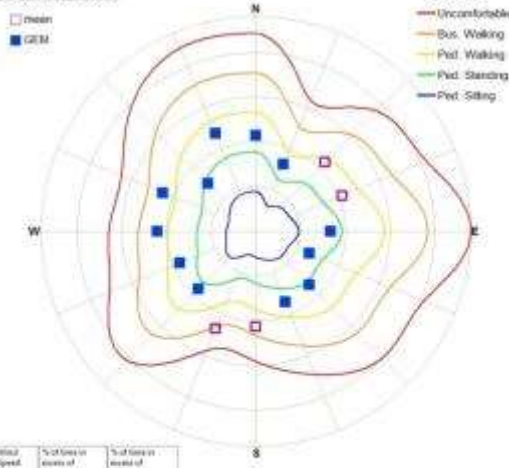
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	49.7	69.4
4.0	28.4	27.0
6.0	20.0	9.1
8.0	3.0	1.3
10.0	1.6	1.1
7.5	5.8	Ped. Walking
11.0	0.012	Auto Walk
7.0	Ped. Walking	5.8
14.2	Pass	0.012

LOCATION 3.1



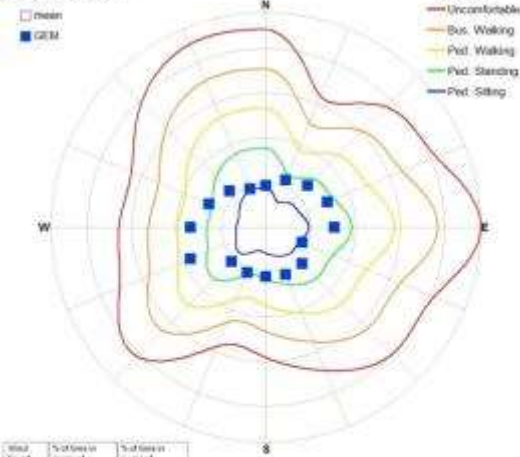
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.7	80.3
4.0	43.0	36.7
6.0	21.3	13.8
8.0	6.5	4.2
10.0	1.2	1.0
1.0	5.8	Bus. Walking
16.3	0.012	Auto Walk
7.0	Ped. Walking	5.8
13.5	Pass	0.012

LOCATION 4.1



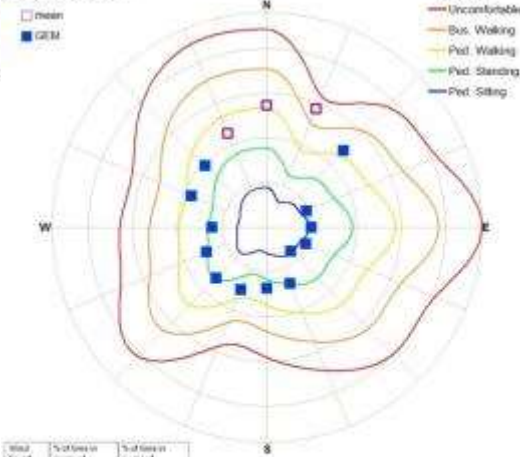
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	80.4	67.4
4.0	20.0	22.2
6.0	4.2	4.2
8.0	0.0	0.0
10.0	0.1	0.1
3.0	5.8	Ped. Standing
11.4	0.012	Pass
3.7	Ped. Standing	5.8
10.8	Pass	0.012

LOCATION 5.1



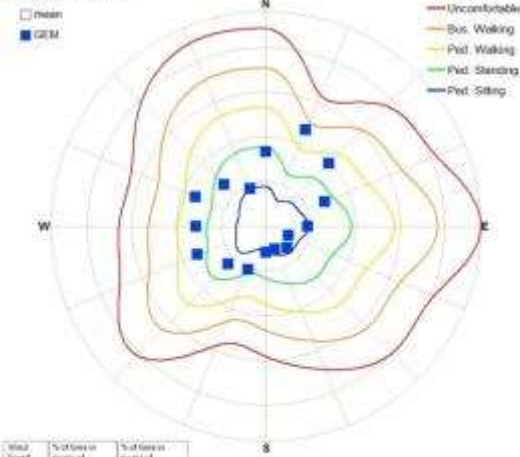
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.1	50.8
4.0	23.1	16.8
6.0	10.0	8.3
8.0	5.0	4.0
10.0	3.0	2.0
12.0	1.8	1.0
14.0	0.812	0.5
16.0	0.4	0.25
18.0	0.2	0.125
20.0	0.1	0.0625

LOCATION 6.1



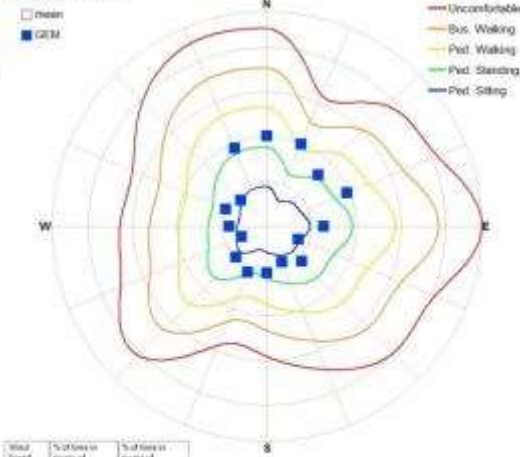
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	47.8	33.8
4.0	20.8	15.3
6.0	11.8	8.3
8.0	6.0	4.0
10.0	3.2	2.0
12.0	1.8	1.0
14.0	0.812	0.5
16.0	0.4	0.25
18.0	0.2	0.125
20.0	0.1	0.0625

LOCATION 7.1



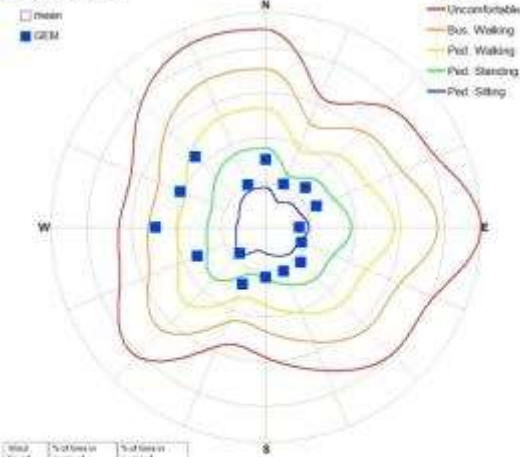
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.4	50.7
4.0	23.0	16.7
6.0	12.5	8.6
8.0	6.0	4.3
10.0	3.0	2.0
12.0	1.8	1.0
14.0	0.812	0.5
16.0	0.4	0.25
18.0	0.2	0.125
20.0	0.1	0.0625

LOCATION 8.1



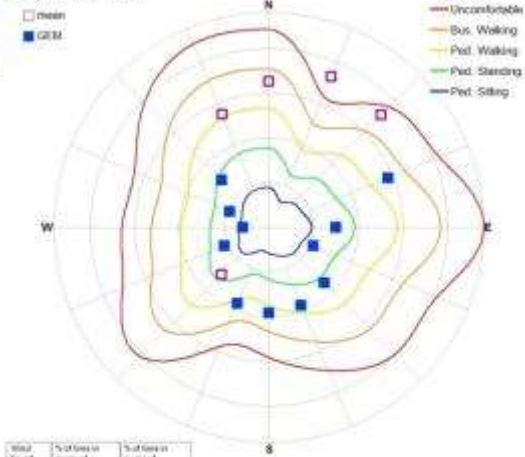
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.4	50.8
4.0	23.0	16.8
6.0	12.5	8.6
8.0	6.0	4.3
10.0	3.0	2.0
12.0	1.8	1.0
14.0	0.812	0.5
16.0	0.4	0.25
18.0	0.2	0.125
20.0	0.1	0.0625

LOCATION 9.1



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.0	46.8
4.0	4.7	7.6
6.0	2.8	1.8
8.0	0.1	0.1
10.0	0.0	0.0
7.0	5.8	Ped. Sitting
6.0	0.012	Pass.
4.5	Ped. Standing	5.8
11.0	Pass.	0.012

LOCATION 10.1



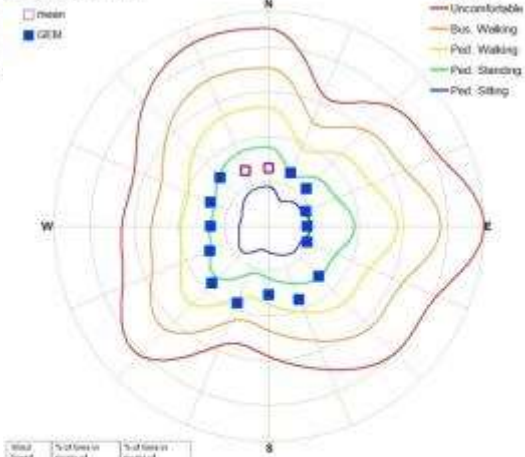
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	54.1	36.1
4.0	23.0	13.8
6.0	8.8	7.0
8.0	3.0	1.9
10.0	1.2	0.2
7.0	5.8	Ped. Walking
10.0	0.012	Pass.
6.0	Ped. Walking	5.8
12.0	Pass.	0.012

LOCATION 11.1



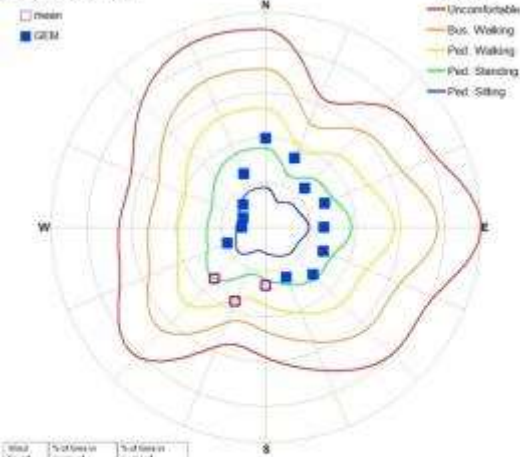
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	58.8	40.8
4.0	26.1	21.0
6.0	12.0	10.0
8.0	7.0	4.4
10.0	4.0	1.0
6.0	5.8	Bus. Walking
10.0	0.012	Min. Risk
11.0	Ped. Walking	5.8
12.0	Pass.	0.012

LOCATION 12.1



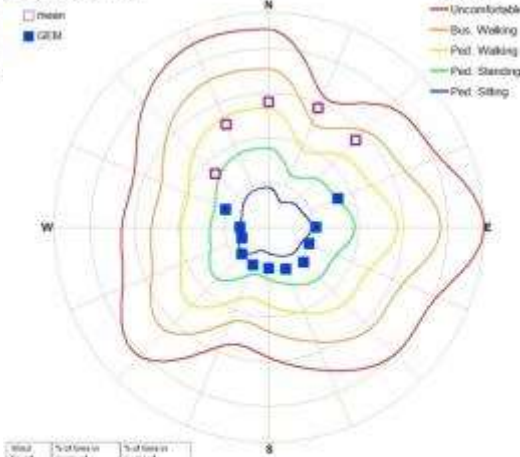
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	58.8	40.8
4.0	26.1	21.0
6.0	8.8	6.8
8.0	6.0	0.1
10.0	3.0	0.0
1.0	5.8	Ped. Sitting
7.0	0.012	Pass.
4.5	Ped. Standing	5.8
6.0	Pass.	0.012

LOCATION 13.1



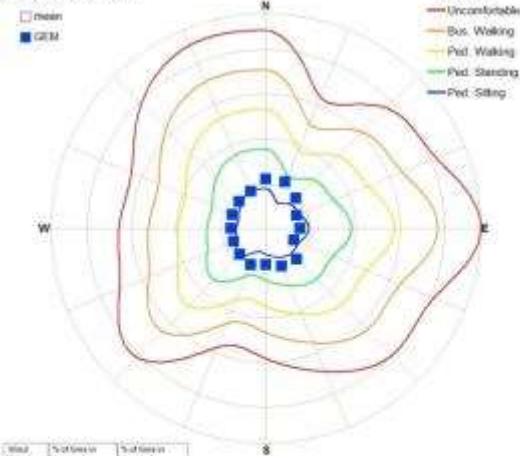
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	97.8	99.7
4.0	4.7	5.3
6.0	1.4	1.3
8.0	0.0	0.0
10.0	0.0	0.0
11.0	5.8	Ped. Sitting
12.0	0.012	Pass
14.0	Ped. Standing	5.8
17.0	Pass	0.012

LOCATION 14.1



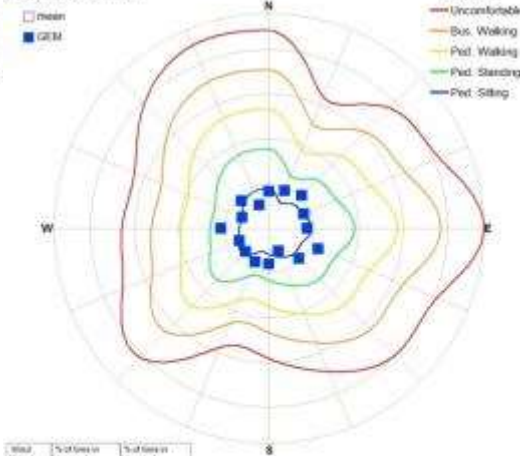
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	97.4	40.8
4.0	21.4	0.7
6.0	4.2	2.1
8.0	1.2	0.2
10.0	0.2	0.0
11.0	5.8	Ped. Standing
12.0	0.012	Pass
14.0	Ped. Standing	5.8
17.0	Pass	0.012

LOCATION 15.1



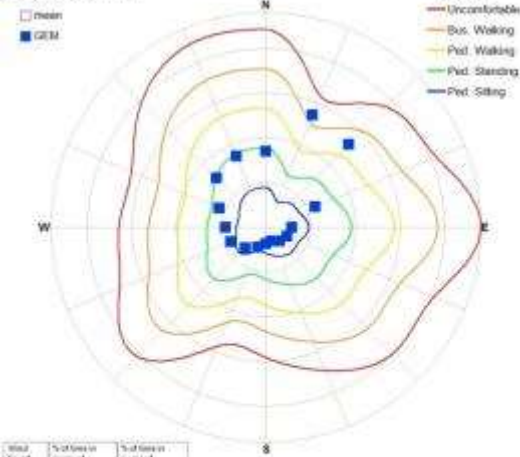
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	79	91.2
4.0	1.1	0.2
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
11.0	5.8	Ped. Sitting
12.0	0.012	Pass
14.0	Ped. Sitting	5.8
17.0	Pass	0.012

LOCATION 16.1



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	5.6	15.2
4.0	0.0	0.0
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
11.0	5.8	Ped. Sitting
12.0	0.012	Pass
14.0	Ped. Sitting	5.8
17.0	Pass	0.012

LOCATION 17.1



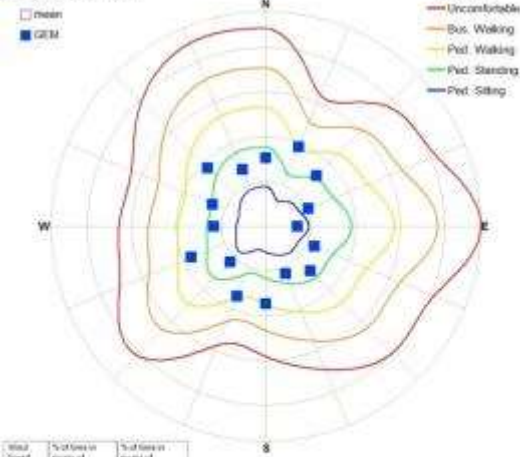
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	14.8	79.8
4.0	5.7	6.5
6.0	1.1	2.6
8.0	0.0	0.7
10.0	0.0	0.1
4.0	5.8	Ped. Standing
6.0	0.022	Ped.
8.0	Ped. Standing	5.8
10.0	Ped.	0.022

LOCATION 18.1



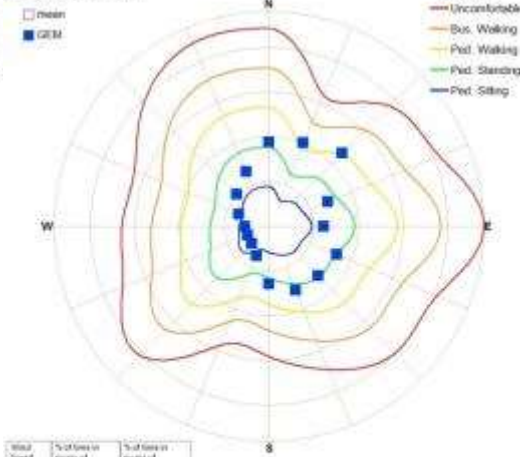
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	19.7	64.9
4.0	10.4	9.0
6.0	1.8	1.6
8.0	0.0	0.1
10.0	0.0	0.0
5.0	5.8	Ped. Standing
7.0	0.022	Ped.
9.0	Ped. Standing	5.8
10.0	Ped.	0.022

LOCATION 19.1



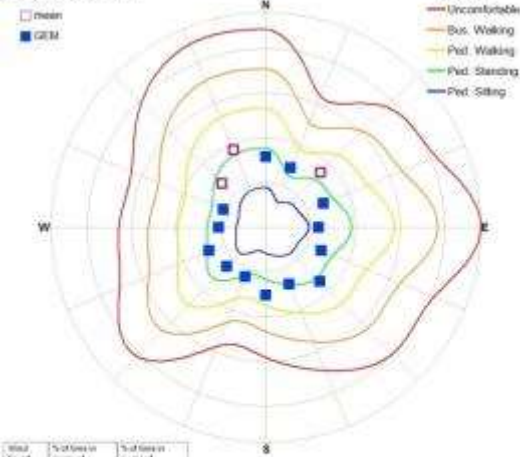
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	17.8	80.2
4.0	6.1	11.7
6.0	0.8	1.5
8.0	0.0	0.1
10.0	0.0	0.0
4.0	5.8	Ped. Sitting
7.0	0.022	Ped.
9.0	Ped. Standing	5.8
10.0	Ped.	0.022

LOCATION 20.1



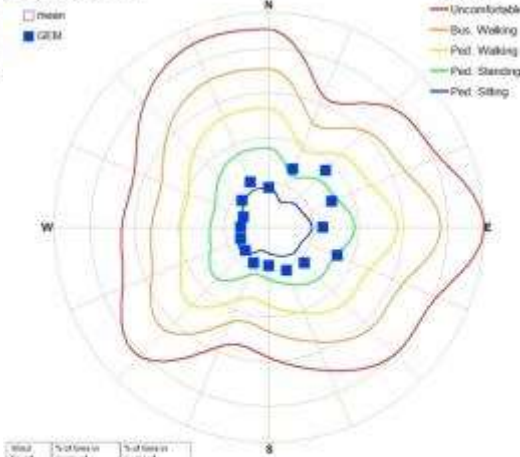
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	27.0	90.3
4.0	11.1	14.1
6.0	1.1	1.1
8.0	0.0	0.0
10.0	0.0	0.0
3.0	5.8	Ped. Sitting
6.0	0.022	Ped.
8.0	Ped. Standing	5.8
10.0	Ped.	0.022

LOCATION 22.1



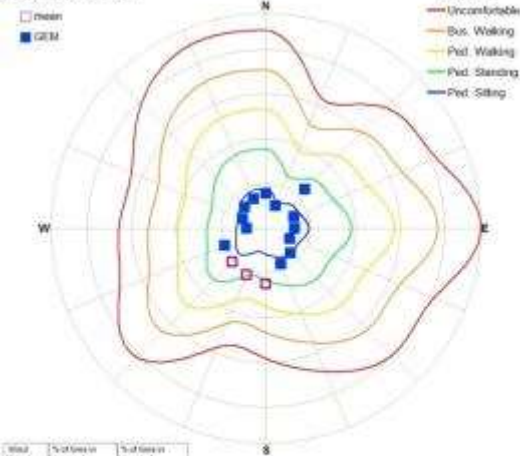
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	24.8	27.9
4.0	2.5	6.3
6.0	0.1	0.2
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
1.0	0.012	Pace
1.5	Ped. Standing	5.8
1.5	Pace	0.012

LOCATION 21.1



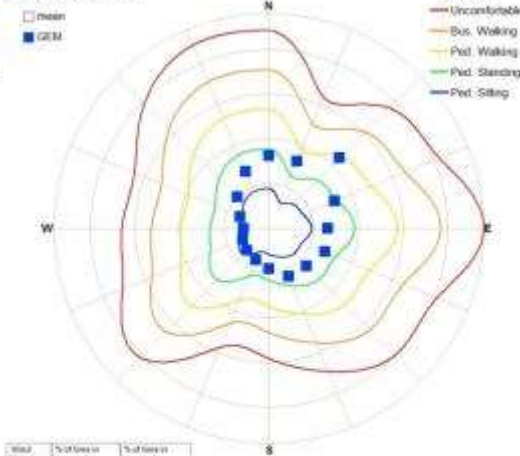
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	27.9	26.1
4.0	0.3	1.1
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
1.0	0.012	Pace
1.5	Ped. Sitting	5.8
1.5	Pace	0.012

LOCATION 23.1



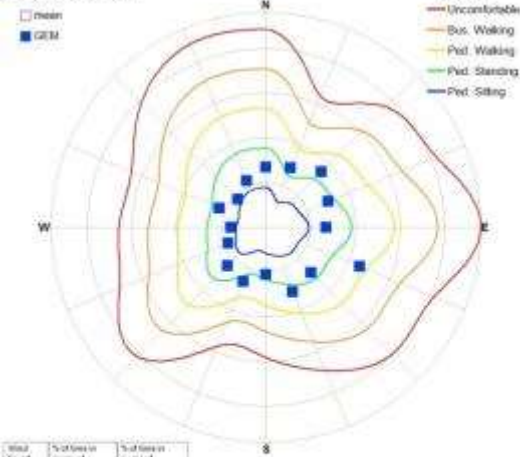
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	17.1	17.9
4.0	1.2	0.0
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
1.0	0.012	Pace
1.5	Ped. Sitting	5.8
1.5	Pace	0.012

LOCATION 24.1



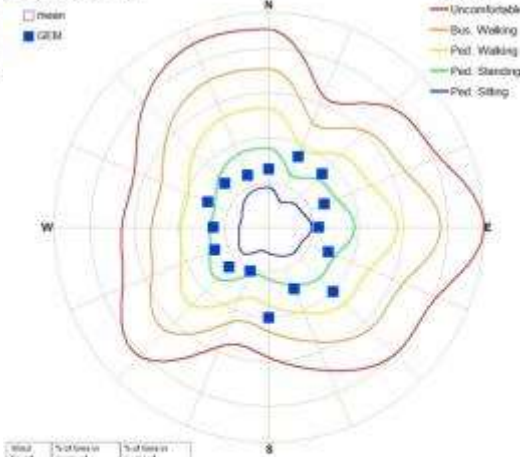
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	17.0	11.8
4.0	0.9	1.1
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.0	N/A	Ped. Sitting
1.0	0.012	Pace
1.5	Ped. Sitting	5.8
1.5	Pace	0.012

LOCATION 25.1



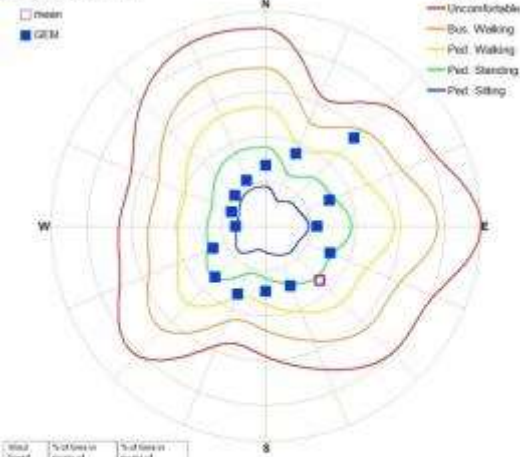
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	21.0	99.8
4.8	1.0	4.7
6.8	0.0	0.2
8.8	0.0	0.0
10.0	0.0	0.0
11.2	N/A	Ped. Sitting
13.0	0.012	Pass
15.0	Ped. Sitting	N/A
17.2	Pass	0.012

LOCATION 26.1



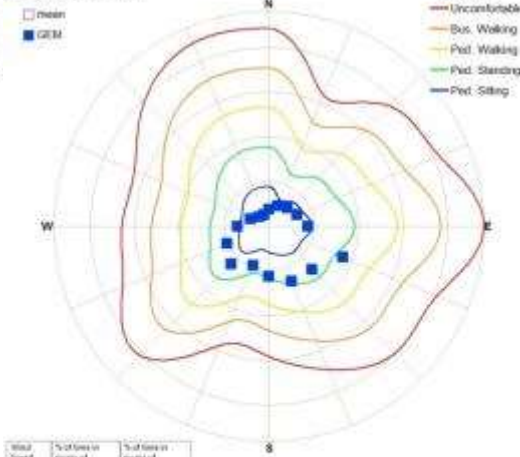
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	27.0	85.9
4.8	1.6	12.7
6.8	0.1	1.0
8.8	0.0	0.2
10.0	0.0	0.0
11.2	N/A	Ped. Sitting
13.0	0.012	Pass
15.0	Ped. Standing	N/A
17.2	Pass	0.012

LOCATION 27.1



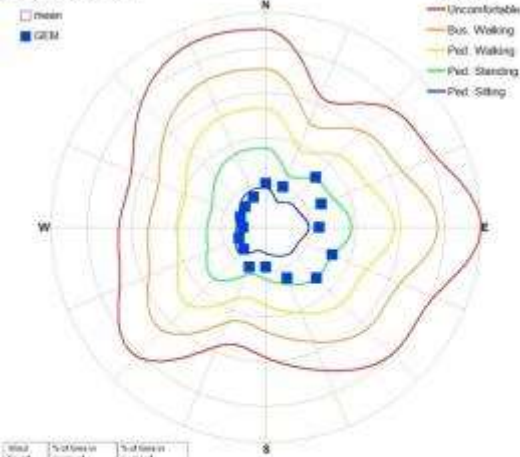
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	25.8	83.8
4.8	1.8	10.1
6.8	0.8	1.8
8.8	0.1	0.2
10.0	0.0	0.0
11.2	N/A	Ped. Standing
13.0	0.012	Pass
15.0	Ped. Standing	N/A
17.2	Pass	0.012

LOCATION 28.1



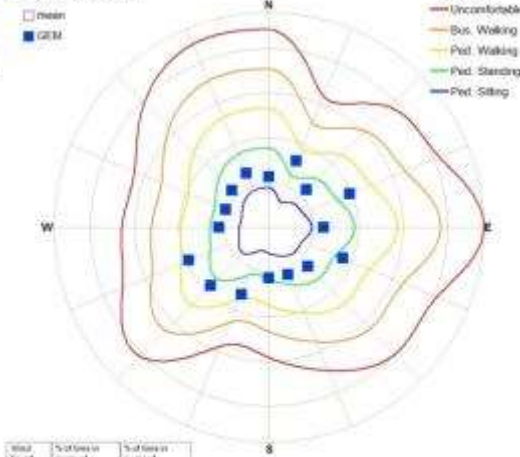
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	7.6	71.8
4.8	0.0	1.0
6.8	0.0	0.0
8.8	0.0	0.0
10.0	0.0	0.0
11.2	N/A	Ped. Sitting
13.0	0.012	Pass
15.0	Ped. Sitting	N/A
17.2	Pass	0.012

LOCATION 29.1



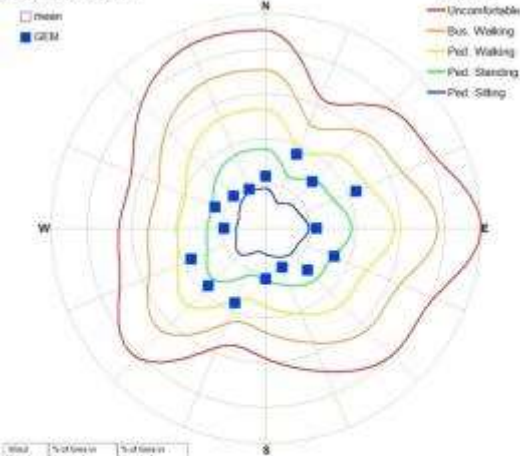
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	20.7	26.2
4.0	5.1	11.1
6.0	0.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
1.4	N/A	Ped. Sitting
1.6	0.012	Ped.
1.7	Ped. Standing	N/A
1.7	Ped.	0.012

LOCATION 30.1



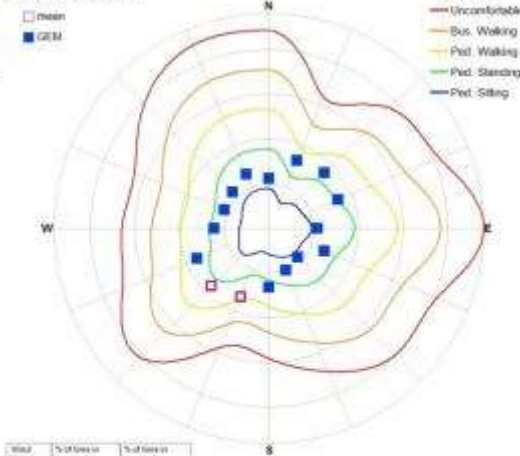
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	27.0	41.1
4.0	1.1	6.4
6.0	0.1	0.4
8.0	0.0	0.0
10.0	0.0	0.0
1.4	N/A	Ped. Sitting
1.5	0.012	Ped.
1.7	Ped. Standing	N/A
1.0	Ped.	0.012

LOCATION 31.1



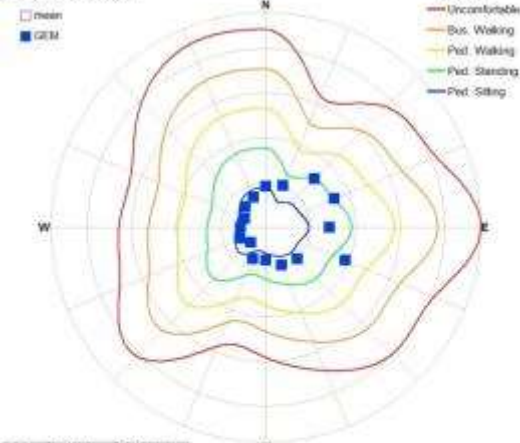
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	25.7	32.0
4.0	2.5	7.4
6.0	0.1	0.3
8.0	0.0	0.0
10.0	0.0	0.0
1.4	N/A	Ped. Sitting
1.6	0.012	Ped.
1.7	Ped. Standing	N/A
1.0	Ped.	0.012

LOCATION 32.1



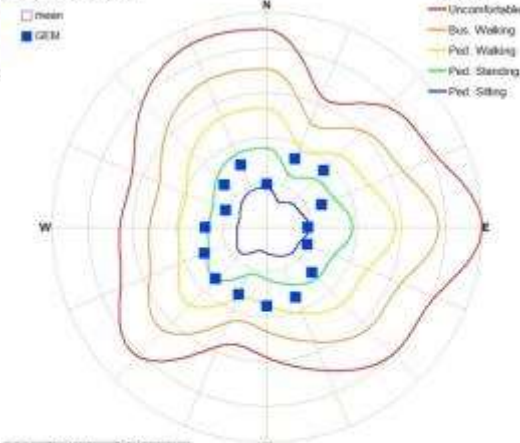
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	26.2	41.2
4.0	1.8	7.1
6.0	0.1	0.4
8.0	0.0	0.0
10.0	0.0	0.0
1.4	N/A	Ped. Sitting
1.6	0.012	Ped.
1.7	Ped. Standing	N/A
1.0	Ped.	0.012

LOCATION 33.1



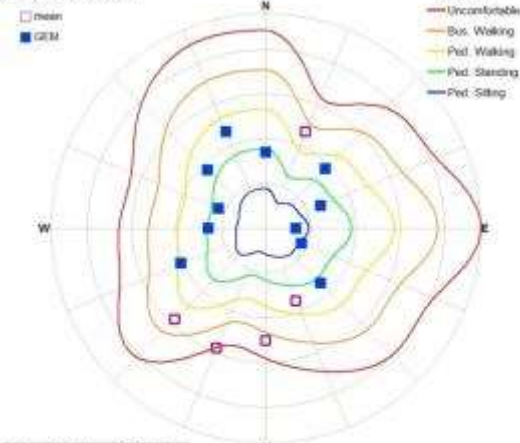
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	5.3	79.8
4.0	16.0	1.0
6.0	10.0	0.0
8.0	0.0	0.0
10.0	0.0	0.0
12.0	0.0	0.0
15.0	0.0	0.0
20.0	0.0	0.0
25.0	0.0	0.0
30.0	0.0	0.0
35.0	0.0	0.0
40.0	0.0	0.0
45.0	0.0	0.0
50.0	0.0	0.0
55.0	0.0	0.0
60.0	0.0	0.0
65.0	0.0	0.0
70.0	0.0	0.0
75.0	0.0	0.0
80.0	0.0	0.0
85.0	0.0	0.0
90.0	0.0	0.0
95.0	0.0	0.0
100.0	0.0	0.0
105.0	0.0	0.0
110.0	0.0	0.0
115.0	0.0	0.0
120.0	0.0	0.0
125.0	0.0	0.0
130.0	0.0	0.0
135.0	0.0	0.0
140.0	0.0	0.0
145.0	0.0	0.0
150.0	0.0	0.0
155.0	0.0	0.0
160.0	0.0	0.0
165.0	0.0	0.0
170.0	0.0	0.0
175.0	0.0	0.0
180.0	0.0	0.0
185.0	0.0	0.0
190.0	0.0	0.0
195.0	0.0	0.0
200.0	0.0	0.0
205.0	0.0	0.0
210.0	0.0	0.0
215.0	0.0	0.0
220.0	0.0	0.0
225.0	0.0	0.0
230.0	0.0	0.0
235.0	0.0	0.0
240.0	0.0	0.0
245.0	0.0	0.0
250.0	0.0	0.0
255.0	0.0	0.0
260.0	0.0	0.0
265.0	0.0	0.0
270.0	0.0	0.0
275.0	0.0	0.0
280.0	0.0	0.0
285.0	0.0	0.0
290.0	0.0	0.0
295.0	0.0	0.0
300.0	0.0	0.0

LOCATION 34.1



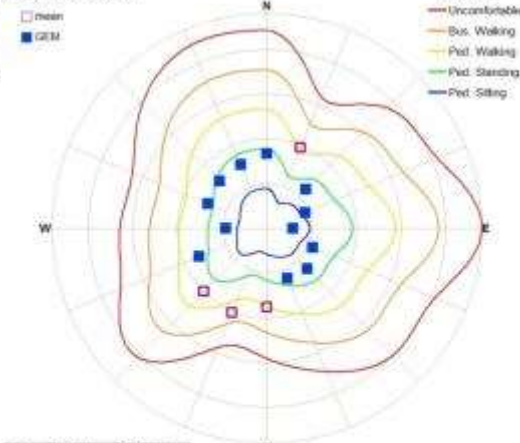
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	12.2	64.4
4.0	5.0	21.7
6.0	0.2	1.1
8.0	0.0	0.1
10.0	0.0	0.0
12.0	0.0	0.0
15.0	0.0	0.0
20.0	0.0	0.0
25.0	0.0	0.0
30.0	0.0	0.0
35.0	0.0	0.0
40.0	0.0	0.0
45.0	0.0	0.0
50.0	0.0	0.0
55.0	0.0	0.0
60.0	0.0	0.0
65.0	0.0	0.0
70.0	0.0	0.0
75.0	0.0	0.0
80.0	0.0	0.0
85.0	0.0	0.0
90.0	0.0	0.0
95.0	0.0	0.0
100.0	0.0	0.0
105.0	0.0	0.0
110.0	0.0	0.0
115.0	0.0	0.0
120.0	0.0	0.0
125.0	0.0	0.0
130.0	0.0	0.0
135.0	0.0	0.0
140.0	0.0	0.0
145.0	0.0	0.0
150.0	0.0	0.0
155.0	0.0	0.0
160.0	0.0	0.0
165.0	0.0	0.0
170.0	0.0	0.0
175.0	0.0	0.0
180.0	0.0	0.0
185.0	0.0	0.0
190.0	0.0	0.0
195.0	0.0	0.0
200.0	0.0	0.0
205.0	0.0	0.0
210.0	0.0	0.0
215.0	0.0	0.0
220.0	0.0	0.0
225.0	0.0	0.0
230.0	0.0	0.0
235.0	0.0	0.0
240.0	0.0	0.0
245.0	0.0	0.0
250.0	0.0	0.0
255.0	0.0	0.0
260.0	0.0	0.0
265.0	0.0	0.0
270.0	0.0	0.0
275.0	0.0	0.0
280.0	0.0	0.0
285.0	0.0	0.0
290.0	0.0	0.0
295.0	0.0	0.0
300.0	0.0	0.0

LOCATION 35.1



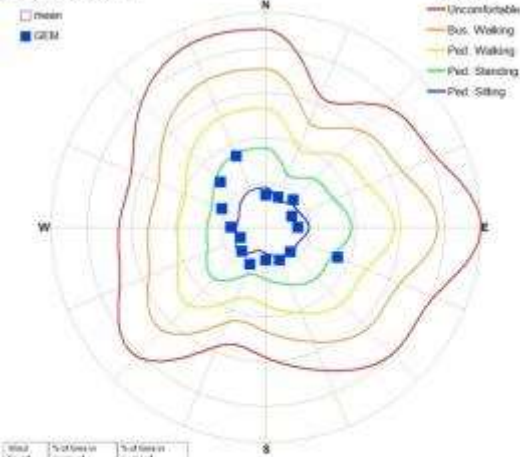
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	12.1	59.4
4.0	22.6	21.5
6.0	6.8	5.5
8.0	3.2	1.6
10.0	0.4	0.1
12.0	0.0	0.0
15.0	0.0	0.0
20.0	0.0	0.0
25.0	0.0	0.0
30.0	0.0	0.0
35.0	0.0	0.0
40.0	0.0	0.0
45.0	0.0	0.0
50.0	0.0	0.0
55.0	0.0	0.0
60.0	0.0	0.0
65.0	0.0	0.0
70.0	0.0	0.0
75.0	0.0	0.0
80.0	0.0	0.0
85.0	0.0	0.0
90.0	0.0	0.0
95.0	0.0	0.0
100.0	0.0	0.0
105.0	0.0	0.0
110.0	0.0	0.0
115.0	0.0	0.0
120.0	0.0	0.0
125.0	0.0	0.0
130.0	0.0	0.0
135.0	0.0	0.0
140.0	0.0	0.0
145.0	0.0	0.0
150.0	0.0	0.0
155.0	0.0	0.0
160.0	0.0	0.0
165.0	0.0	0.0
170.0	0.0	0.0
175.0	0.0	0.0
180.0	0.0	0.0
185.0	0.0	0.0
190.0	0.0	0.0
195.0	0.0	0.0
200.0	0.0	0.0
205.0	0.0	0.0
210.0	0.0	0.0
215.0	0.0	0.0
220.0	0.0	0.0
225.0	0.0	0.0
230.0	0.0	0.0
235.0	0.0	0.0
240.0	0.0	0.0
245.0	0.0	0.0
250.0	0.0	0.0
255.0	0.0	0.0
260.0	0.0	0.0
265.0	0.0	0.0
270.0	0.0	0.0
275.0	0.0	0.0
280.0	0.0	0.0
285.0	0.0	0.0
290.0	0.0	0.0
295.0	0.0	0.0
300.0	0.0	0.0

LOCATION 36.1



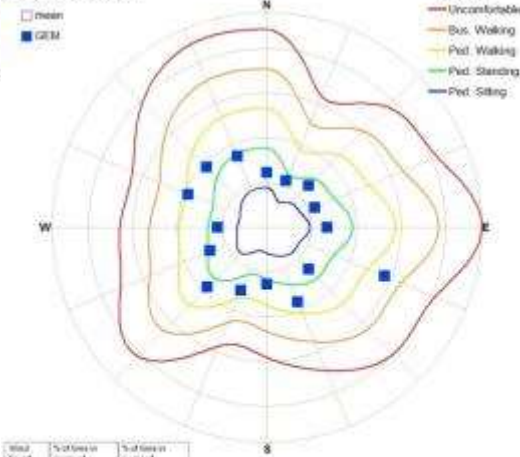
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	19.4	65.1
4.0	21.7	4.6
6.0	1.8	0.8
8.0	0.2	0.1
10.0	0.0	0.0
12.0	0.0	0.0
15.0	0.0	0.0
20.0	0.0	0.0
25.0	0.0	0.0
30.0	0.0	0.0
35.0	0.0	0.0
40.0	0.0	0.0
45.0	0.0	0.0
50.0	0.0	0.0
55.0	0.0	0.0
60.0	0.0	0.0
65.0	0.0	0.0
70.0	0.0	0.0
75.0	0.0	0.0
80.0	0.0	0.0
85.0	0.0	0.0
90.0	0.0	0.0
95.0	0.0	0.0
100.0	0.0	0.0
105.0	0.0	0.0
110.0	0.0	0.0
115.0	0.0	0.0
120.0	0.0	0.0
125.0	0.0	0.0
130.0	0.0	0.0
135.0	0.0	0.0
140.0	0.0	0.0
145.0	0.0	0.0
150.0	0.0	0.0
155.0	0.0	0.0
160.0	0.0	0.0
165.0	0.0	0.0
170.0	0.0	0.0
175.0	0.0	0.0
180.0	0.0	0.0
185.0	0.0	0.0
190.0	0.0	0.0
195.0	0.0	0.0
200.0	0.0	0.0
205.0	0.0	0.0
210.0	0.0	0.0
215.0	0.0	0.0
220.0	0.0	0.0
225.0	0.0	0.0
230.0	0.0	0.0
235.0	0.0	0.0
240.0	0.0	0.0
245.0	0.0	0.0
250.0	0.0	0.0
255.0	0.0	0.0
260.0	0.0	0.0
265.0	0.0	0.0
270.0	0.0	0.0
275.0	0.0	0.0
280.0	0.0	0.0
285.0	0.0	0.0
290.0	0.0	0.0
295.0	0.0	0.0
300.0	0.0	0.0

LOCATION 37.1



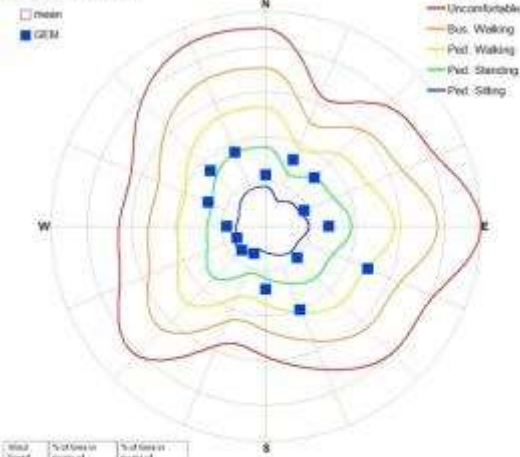
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	10.0	31.4
4.8	3.3	23.9
6.8	0.0	11.1
8.8	0.0	0.0
10.0	0.0	0.0
11	1.8	Outdoor Entry
13.7	0.012	Pace
17	Ped. Sitting	1.8
23	Pace	0.012

LOCATION 38.1



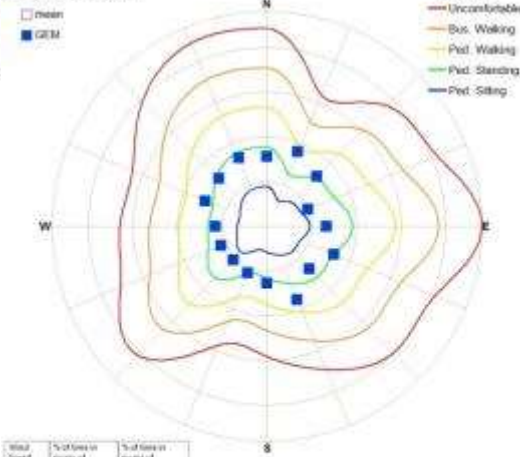
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	27.2	12.9
4.8	11.1	0.1
6.8	0.1	1.1
8.8	0.0	0.1
10.0	0.0	0.0
11	1.8	Ped. Sitting
13.7	0.012	Pace
17	Ped. Standing	1.8
23	Pace	0.012

LOCATION 39.1



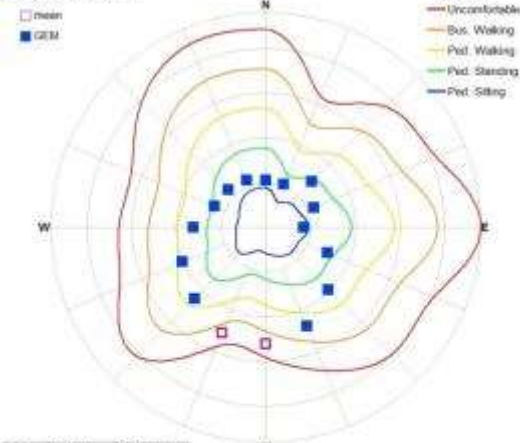
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	29.4	11.8
4.8	11.1	0.0
6.8	0.1	0.1
8.8	0.0	0.1
10.0	0.0	0.0
11	1.8	Ped. Sitting
13.7	0.012	Pace
17	Ped. Standing	1.8
23	Pace	0.012

LOCATION 40.1



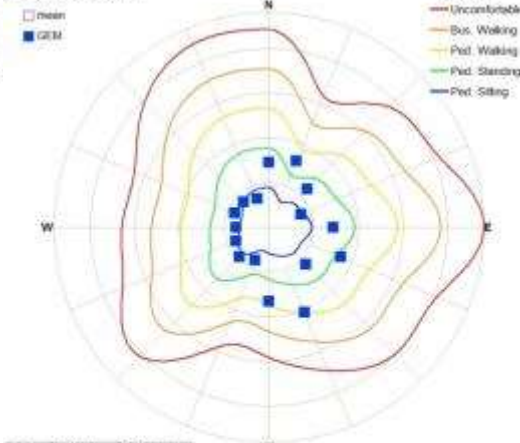
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	27.2	12.9
4.8	11.1	0.0
6.8	0.1	0.1
8.8	0.0	0.0
10.0	0.0	0.0
11	1.8	Ped. Sitting
13.7	0.012	Pace
17	Ped. Standing	1.8
23	Pace	0.012

LOCATION 41.1



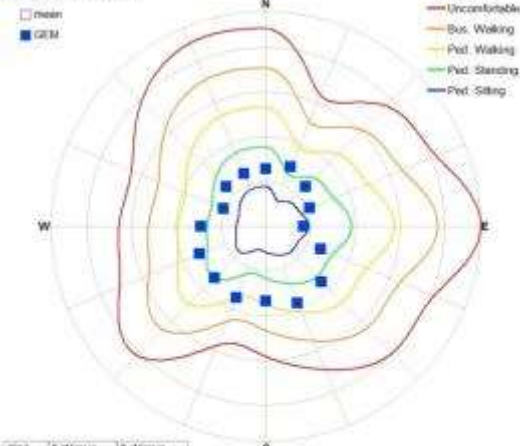
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	18.8	20.9
4.8	17.4	20.7
6.8	7.1	6.2
8.8	2.9	1.5
10.0	0.5	0.2
4.0	5.8	Ped. Walking
10.0	0.812	Pass
6.2	Ped. Walking	5.8
12.1	Pass	0.812

LOCATION 42.1



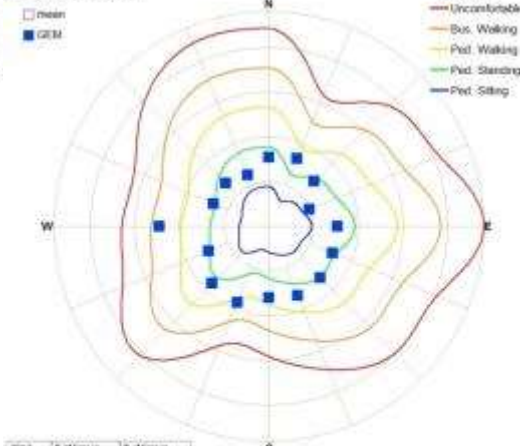
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	21.0	15.1
4.8	1.2	0.8
6.8	0.0	0.7
8.8	0.0	0.1
10.0	0.0	0.0
1.0	5.8	Ped. Sitting
5.8	0.812	Pass
4.8	Ped. Standing	5.8
6.7	Pass	0.812

LOCATION 43.1



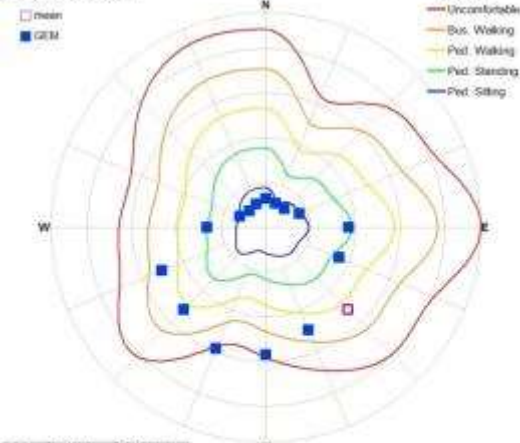
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	17.4	20.5
4.8	0.1	20.5
6.8	0.7	0.8
8.8	0.1	0.1
10.0	0.0	0.0
4.0	5.8	Ped. Standing
8.0	0.812	Pass
4.7	Ped. Standing	5.8
6.7	Pass	0.812

LOCATION 44.1



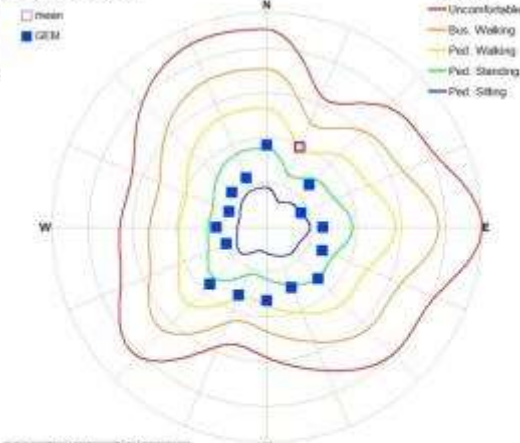
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	19.0	12.4
4.8	0.0	20.8
6.8	1.0	1.8
8.8	0.1	0.1
10.0	0.0	0.0
4.0	5.8	Ped. Standing
1.2	0.812	Pass
1.0	Ped. Standing	5.8
20.5	Pass	0.812

LOCATION 45.1



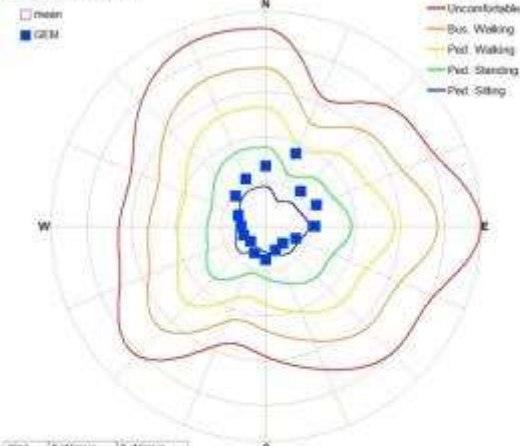
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.0	47.0
4.0	20.7	22.7
6.0	6.0	20.8
8.0	2.2	3.8
10.0	0.4	0.8
6.0	5.8	Ped. Walking
11.4	0.812	Ped. Sitting
7.0	Ped. Walking	5.8
16.8	Pass	0.812

LOCATION 46.1



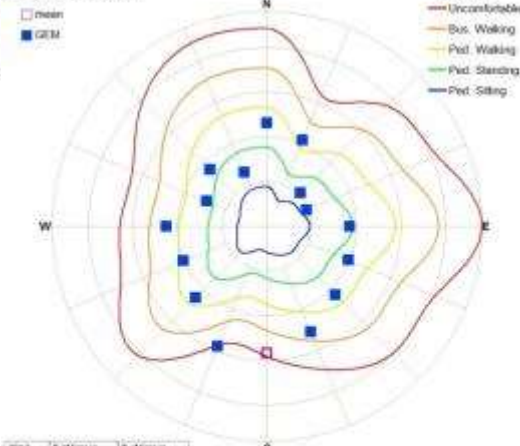
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	77.2	45.8
4.0	5.5	9.7
6.0	2.5	1.0
8.0	0.0	0.0
10.0	0.0	0.0
4.0	5.8	Ped. Standing
7.0	0.812	Pass
4.8	Ped. Standing	5.8
9.2	Pass	0.812

LOCATION 47.1



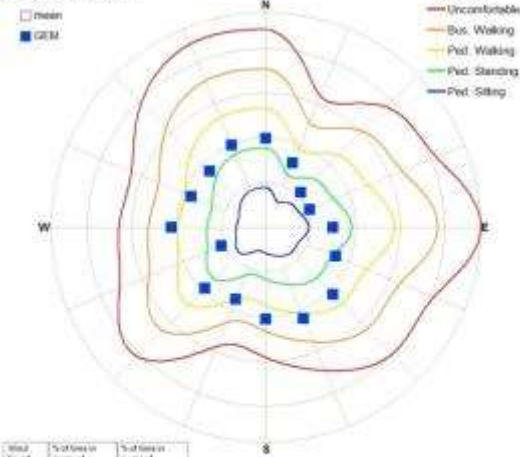
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	80	77.0
4.0	0.0	2.1
6.0	0.0	0.2
8.0	0.0	0.0
10.0	0.0	0.0
2.0	5.8	Ped. Sitting
7.0	0.812	Pass
10	Ped. Sitting	5.8
8.0	Pass	0.812

LOCATION 48.1



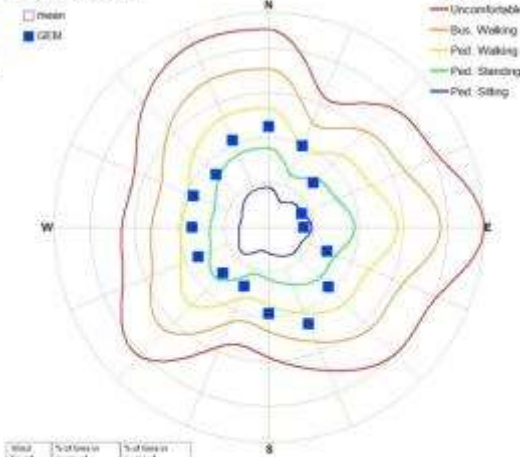
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.0	71.6	64.7
4.0	25.3	20.2
6.0	20.2	11.8
8.0	2.1	2.8
10.0	0.7	0.0
7.0	5.8	Ped. Walking
10.3	0.812	Pass
7.2	Ped. Walking	5.8
16.2	Pass	0.812

LOCATION 49.1



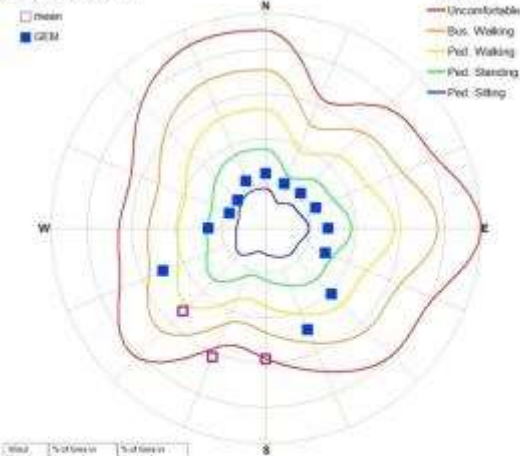
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	46.1	61.9
4.8	11.8	20.5
6.8	1.7	3.7
8.8	0.1	0.8
10.0	0.0	0.0
4.7	5.8	Ped. Standing
6.7	0.812	Pass
8.8	Ped. Standing	5.8
10.4	Pass	0.812

LOCATION 50.1



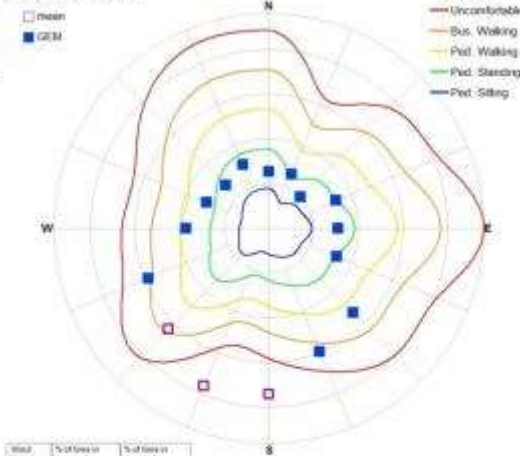
Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	39.1	40.4
4.8	9.8	16.8
6.8	1.1	3.1
8.8	0.1	0.1
10.0	0.0	0.0
4.7	5.8	Ped. Standing
6.7	0.812	Pass
8.8	Ped. Standing	5.8
10.4	Pass	0.812

LOCATION 51.1



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	57.1	69.8
4.8	19.1	29.8
6.8	4.8	8.8
8.8	1.7	2.1
10.0	0.1	0.1
7.4	5.8	Ped. Walking
11.1	0.812	Auto Body
8.8	Ped. walking	5.8
12.7	Pass	0.812

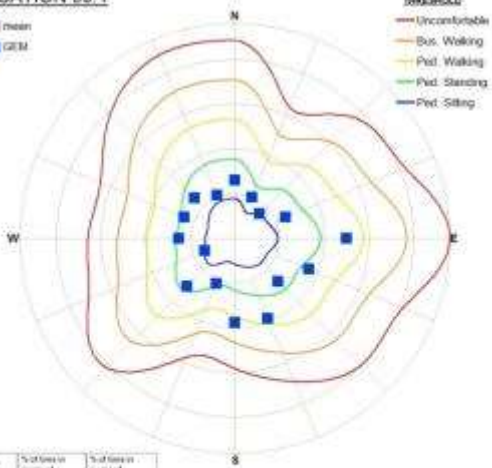
LOCATION 52.1



Wind Speed (m/s)	% of time in excess of Mean	% of time in excess of GEM
2.8	40.8	46.1
4.8	17.4	17.8
6.8	2.8	2.8
8.8	0.1	0.1
10.0	0.0	0.0
6.0	5.8	Bus. Walking
10.1	0.812	Auto Body
7.9	Ped. walking	5.8
13.8	Auto Body	0.812

LOCATION 53.1

□ mean
■ GEM



Wind Speed (m/s)	% of time in excess of this	% of time in excess of GEM
2.8	29.7	41.8
4.8	1.9	10.2
6.8	0.2	1.6
8.8	0.0	0.1
10.8	0.0	0.0
7.2	N/A	Ped. Sitting
7.6	0.012	Pass
6.8	Ped. Standing	5.8
6.2	Pass	0.012