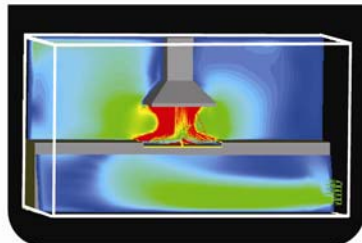
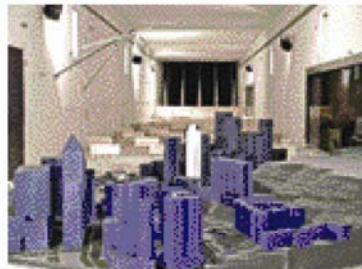
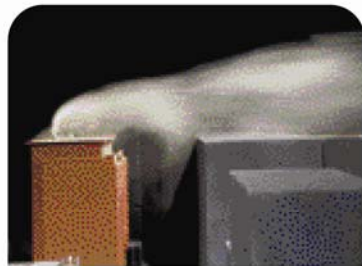




## Final Report



Wind Tunnel Tests for:

### **FRASERS BROADWAY BLOCK 2**

Sydney, NSW, Australia

Prepared for:

Frasers Greencliff Developments  
Pty. Ltd.

Level 11, 488 Kent Street

Sydney

NSW 2000 Australia

CPP Project 4946

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FINAL REPORT

WIND TUNNEL TESTS—FRASERS BROADWAY BLOCK 2  
Sydney, NSW, Australia

CPP Project 4946

July 2009

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## EXECUTIVE SUMMARY

A wind tunnel study of the proposed Frasers Broadway Block 2 development, to be located in Sydney, NSW, Australia, was conducted to assess pedestrian wind comfort. A model of the project was fabricated to a 1:400 scale and centred on a turntable in the wind tunnel located at CPP in St Peters. Replicas of surrounding buildings within a 600 m radius were constructed and placed on the turntable.

The wind tunnel testing was performed in the natural boundary layer wind tunnel of Cermak Peterka Petersen Pty. Ltd., St Peters. Approach boundary layers representative of environment surrounding the proposed development were established in the test section of the wind tunnel. The approach wind flow had appropriate turbulence characteristics corresponding to Terrain Category 3 as defined in AS/NZ1170.2.

Measurements of winds likely to be experienced by pedestrians were made with a hot-film anemometer at 40 locations for 16 wind directions each. These 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. Wind conditions at ground level were generally suitable for use as a main public accessway. Two locations to the east of site resulted in windy conditions which exceeded the general pedestrian distress criterion, but were not classified as dangerous. These exceedances are expected to be localised in spatial extent and would exist regardless for any building of similar massing. Wind conditions on the upper private levels of the development were found to be windy, and are expected to be useable for outdoor sitting for about 75% of the time, which is considered high for buildings of this height and exposure.

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## LIST OF SYMBOLS

|                   |   |
|-------------------|---|
| $D$               | Characteristic dimension (building height, width, etc.) |
| $n$               | Mean velocity profile power law exponent                |
| $T_u$             | Turbulence intensity, $U_{\text{rms}}/U$                |
| $U$               | Local mean velocity                                     |
| $U_{\text{ref}}$  | Reference velocity at reference height $z_{\text{ref}}$ |
| $U_{\text{pk}}$   | Peak wind speed in pedestrian studies                   |
| $U_{\text{rms}}$  | Root-mean-square of fluctuating velocity                |
| $z$               | Height above surface                                    |
| $\nu$             | Kinematic viscosity of approach flow                    |
| $\sigma(\ )$      | Standard deviation of ( ), = ( )'_{\text{rms}}          |
| $\rho$            | 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

Pedestrian acceptability of sidewalks, entrances, plazas, and terraces 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 improve areas found to be excessively windy.

Analytical methods such as computational fluid dynamics (CFD) are not capable, except in very simple geometries, to estimate 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 used. All the data collection was performed in accordance with Australasian Wind Engineering Society (2001), and American Society of Civil Engineers (1999, 2006).

| <i>Configuration A</i> |  |
|------------------------|--|
| Geometry:              | Proposed Frasers Broadway site with an indicative massing model of the proposed UTS development, as shown in Figure 4. |
| Pedestrian Velocities: | Pedestrian winds measured at 40 locations for 16 wind directions in 22.5° increments from 0°.                          |

Table 1: Configurations for data acquisition

## 2. THE WIND TUNNEL TEST

Modelling of the aerodynamic loading on 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 1. 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 16 m long test section, the floor of which is covered with roughness elements, preceded by a vorticity generating fence and spires. The spires, barrier, 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 2 and are explained more fully in Section 4.1.1.

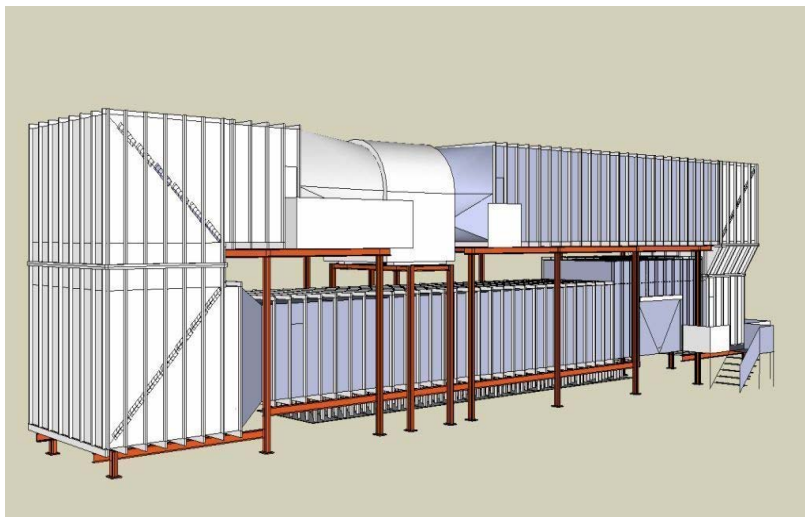


Figure 1: Schematic of the closed circuit wind tunnel

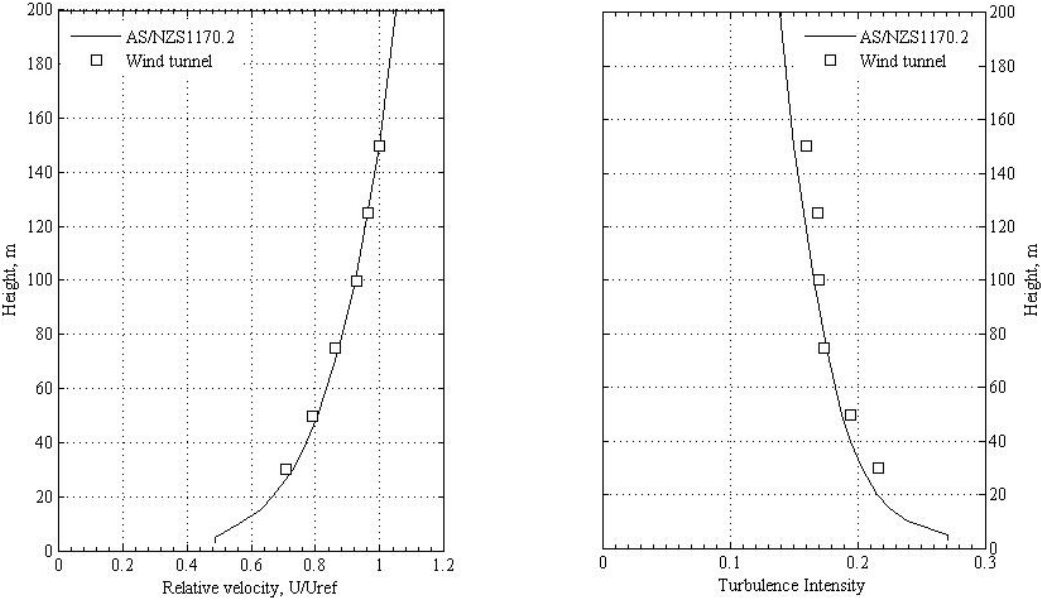


Figure 2: Mean velocity and turbulence profiles approaching the model for Terrain Category 3

A model of the proposed development and surrounds to a radius of 600 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 3. 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.



Figure 3: Photograph of Configuration A model in the CPP wind tunnel

### 3. 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 discomfort, 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 speeds<sup>†</sup>. In both cases, the wind speed used 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; this is intended to account for locations where the gustiness is the dominant characteristic of the wind.

| <b>Comfort</b> (maximum of mean or gust equivalent mean (GEM <sup>1</sup> ) 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   |
| <b>Distress</b> (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 |

Note: <sup>1</sup> The gust equivalent mean (GEM) is the peak 3 s gust wind speed divided by 1.85.

Table 2: Summary of Lawson criteria

<sup>†</sup> 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.

## 4. DATA ACQUISITION AND RESULTS

### 4.1 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 4.1.2. All velocity measurements were made with the hot-film anemometer, 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)

*4.1.1 Velocity Profiles* Mean velocity and turbulence intensity profiles for the boundary layer flow approaching the model are shown in Figure 2. Turbulence intensities are related to the local mean wind speed. These profiles have the form as defined in Standards Australia (2002) and are appropriate for the approach conditions.

*4.1.2 Pedestrian Winds* The proposed Frasers Broadway development is located on the former Carlton United Brewery site to the south-west of Sydney CBD, bounded by Broadway, and Kensington, Wellington, O'Connor, and Abercrombie Streets. The development consists of 15 buildings on 11 separate blocks as annotated in Figure 4. Block 2 is located in the north-east section of the side fronting Broadway. Wind speed measurements were recorded at 40 locations to evaluate pedestrian comfort at ground level in and around the project site, Figure 4 and Figure 5. Velocity measurements were made at the model scale equivalent of 1.5 to 2.1 m above the 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 frequently are found, near building entrances and on adjacent sidewalks with heavy pedestrian traffic, and in open plaza areas. One or more comparative pedestrian positions, located in a familiar or relatively undisturbed area near the project site, were also tested for reference purposes.

The hot-wire signal was sampled by 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 normalized by the tunnel reference velocity  $U_{\text{ref}}$ . Mean and turbulence statistics were calculated and used to estimate the

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

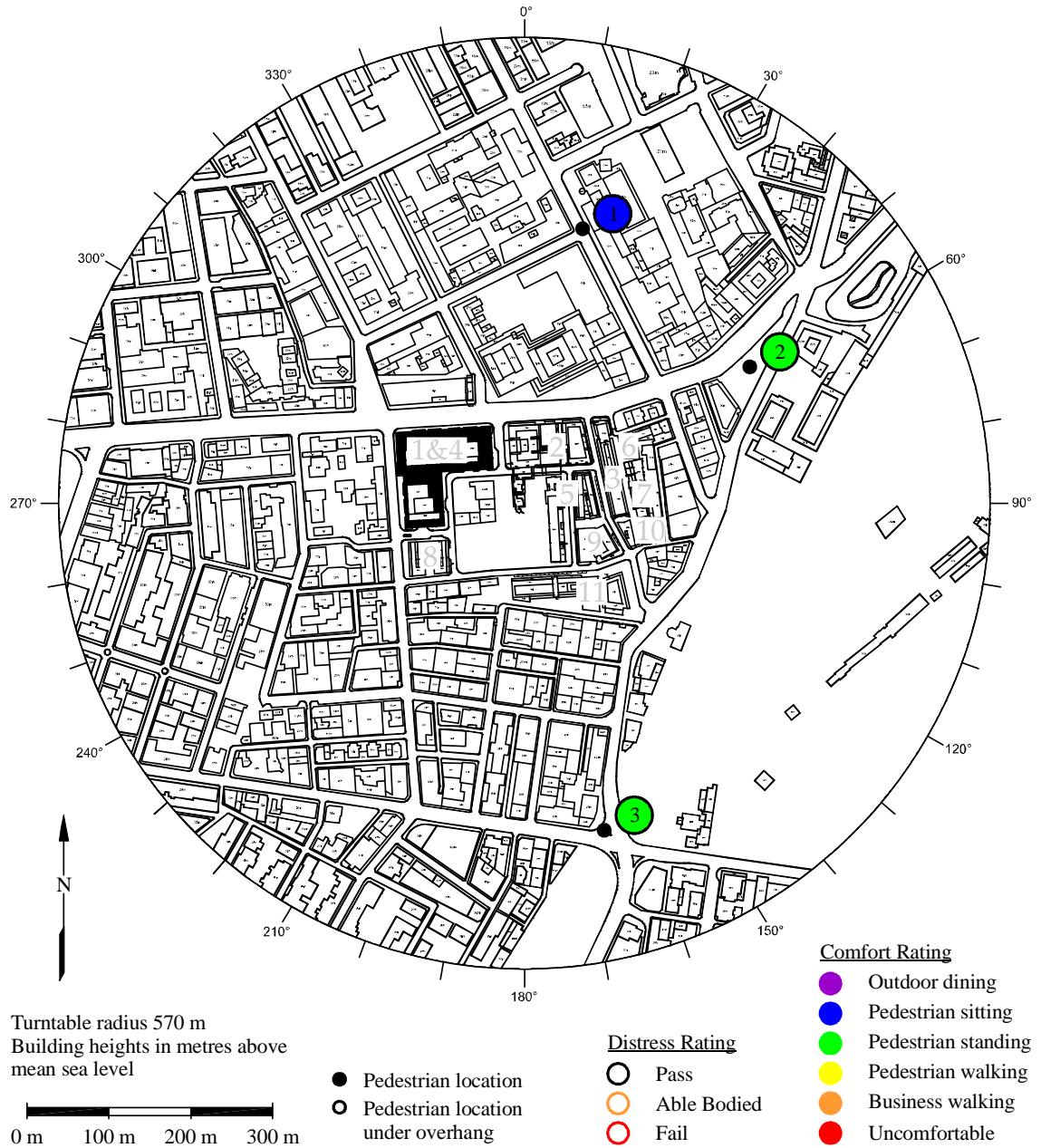
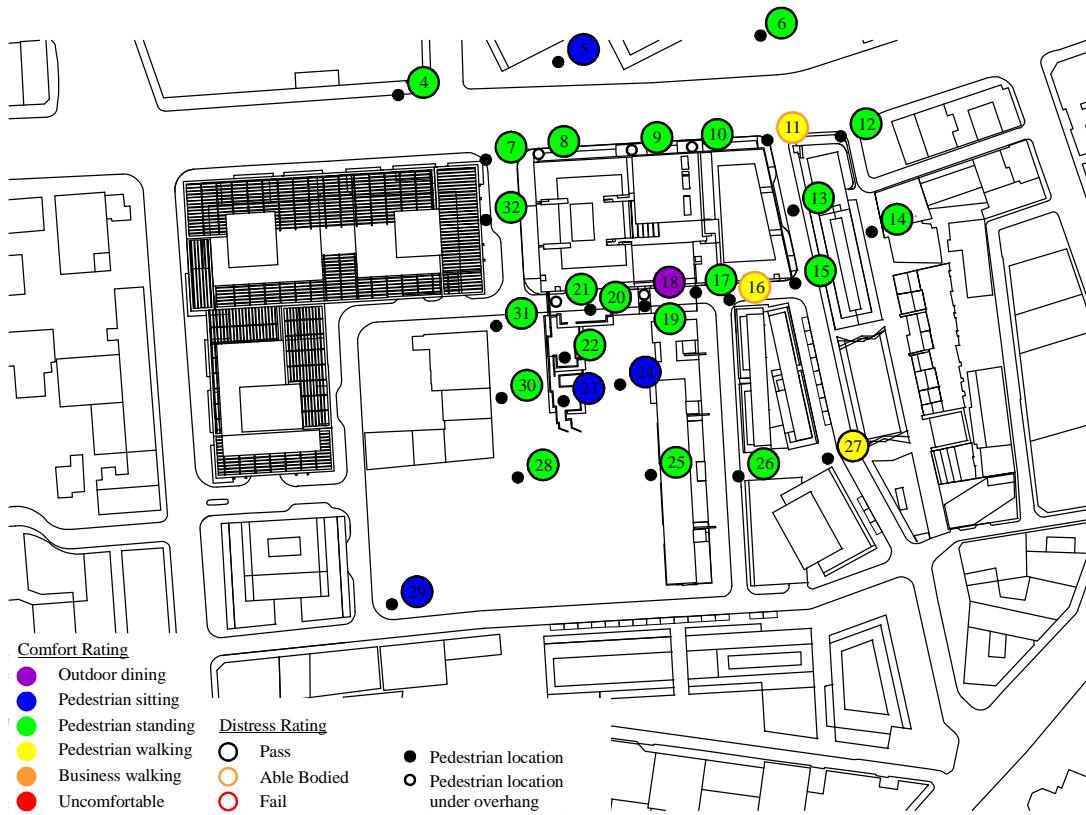
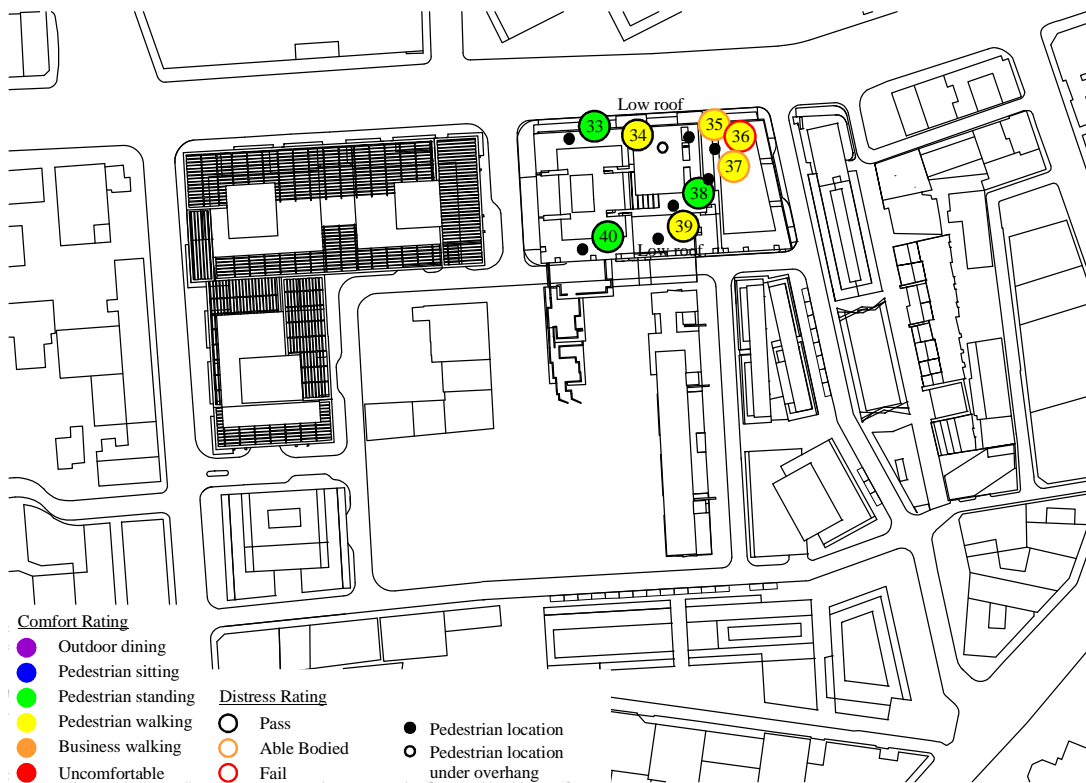


Figure 4: Remote pedestrian wind speed measurement locations with comfort/distress ratings



a. Configuration A: Ground level complete development with additional awning

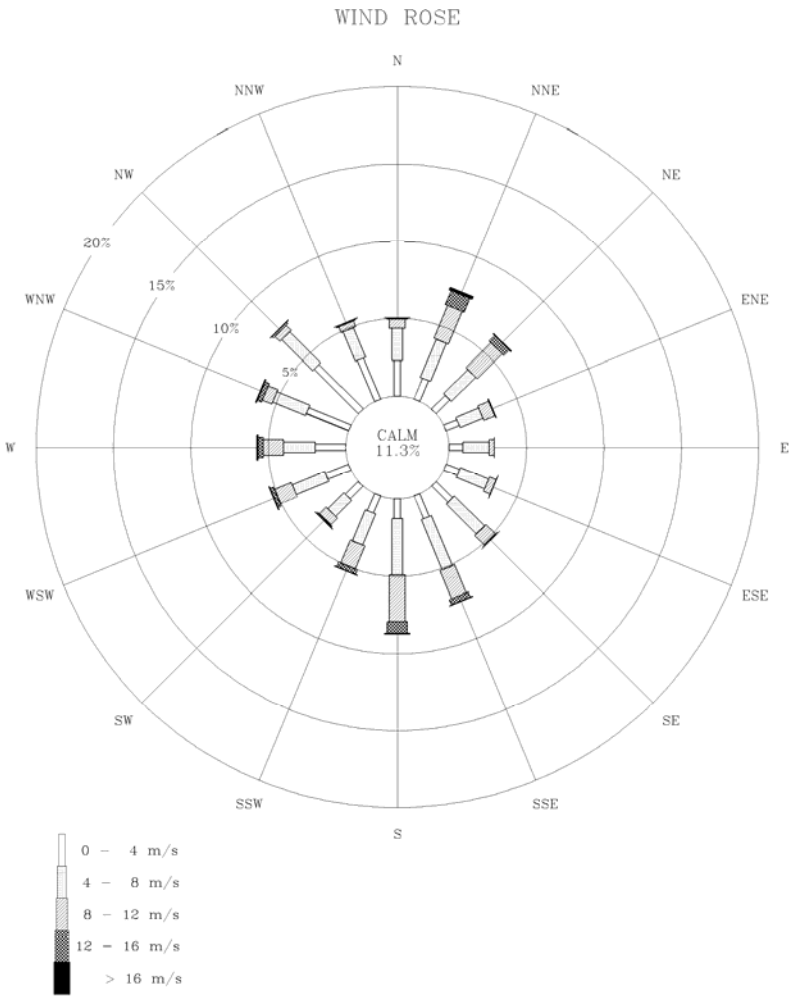


b. Configuration A: Upper levels complete development

Figure 5: Pedestrian wind speed measurement locations with comfort/distress ratings

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. The graphs show velocity magnitude and the approach wind direction for which that velocity was measured. The polar plots aid in visualization 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 height of 10 m at Sydney Airport from 1986 to 2007, Figure 6. From these data, directional criterion lines for the Lawson rating wind speeds have been calculated and included on the polar plots in Appendix 2; this gives additional information regarding directional sensitivity at each location.



Sydney International Airport (#947670)  
1986-2007: Anemometer corrected to 10 m Open Country  
Source: NCDC EarthInfo

Figure 6: Wind rose of direction and speed for Sydney Airport

The criteria of Lawson consider the integration of the velocity measurements with local wind climate statistical data summarized in Figure 6 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. 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 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.

The tables in Appendix 2 under the polar plots give the wind speed exceeded 5% and 0.022% for direct comparison with the Lawson criteria and the associated Lawson ratings for both mean and GEM wind speeds. A colour coded summary assessment of pedestrian comfort and safety with respect to the Lawson criteria is presented in Figure 4 and Figure 5 for each test location. 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 Figure 4 and Figure 5. The implications of the results are discussed in Section 5.

| 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.  |

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

## 5. DISCUSSION

The wind climatology chart of Figure 6 indicates that the most frequent strong winds are from the north-east, south, and west quadrants. Locations such as points 11 and 27, which are sensitive to these directions, Appendix 2, will be more likely to experience higher speeds more often, and thus develop a reputation for being windy. The influence of wind direction on the suitability of a location for an intended purpose can be ascertained from the graphs in Appendix 2.

The primary conclusions of the pedestrian study can be understood by reviewing the colour coded image of Figure 4 and Figure 5, 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. 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%. 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, and may be necessary for other locations depending on the intended use of the space. Although 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.

It is evident from Figure 4 and Figure 5 that the wind environment around the proposed development is generally satisfactory for the intended use of the space. The general wind amenity of the site is typically comparable to wind conditions remote from the site (locations 1 to 3). These surrounding locations give a general indication of the surrounding wind climate and can be used for comparison to the wind environment in and around the development.

Wind conditions are reasonably uniform across the site and with respect to the Lawson criteria are generally fit for purpose. For comparative purposes, wind conditions across the site with no developments are shown in. These results show a similar classification across the site. This occurs because the large building massing creates sheltered conditions for some directions, but accelerated channelled conditions from other directions. The severity of this can be ascertained from inspection of the directional data in Appendix 2.

Wind conditions at ground level, Figure 5a, are generally acceptable for use as a main public accessway. No dangerous locations were recorded across the site. Although satisfying the pedestrian walking comfort criterion, Locations 11 and 16 exceed the distress criterion for general bodied pedestrians and are classified for able bodied pedestrians only. These conditions are caused by winds from the east quadrant striking the broad eastern façade of the tower the accelerating down and around the upwind corners; this is evidenced by the winds being dominated by the mean rather than the gust winds speed.

Location 11 also has winds from the north-west quadrant accelerated along the Broadway façade and up the rise along Broadway. Initially Location 11 was tested with the eastern awning as per Figure 7, however in this configuration it failed the distress criterion. Extending the awning around the corner to overlap the existing into Broadway considerably improved pedestrian wind conditions. For Location 11 the influence of the winds from the eastern quadrant are reasonably localised as the neighbouring locations are unaffected. The winds from the north-west quadrant are similar to the adjacent location. To further improve wind conditions at Location 11, the eastern awning would need to extend further from the eastern façade.

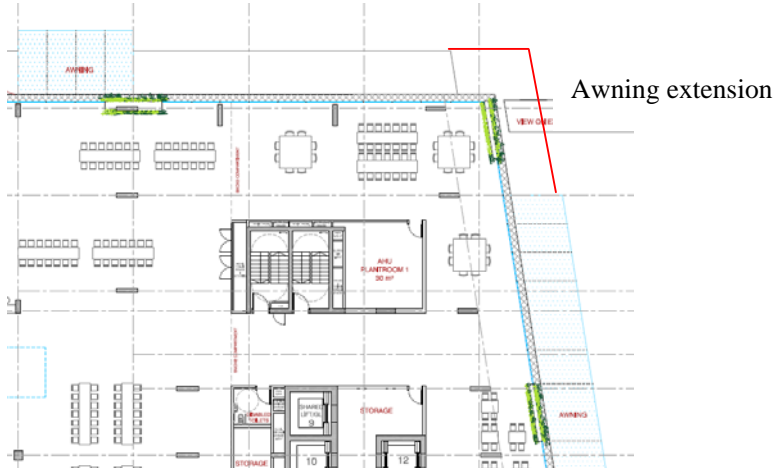


Figure 7:Awning plan for the north-east corner of Block 2

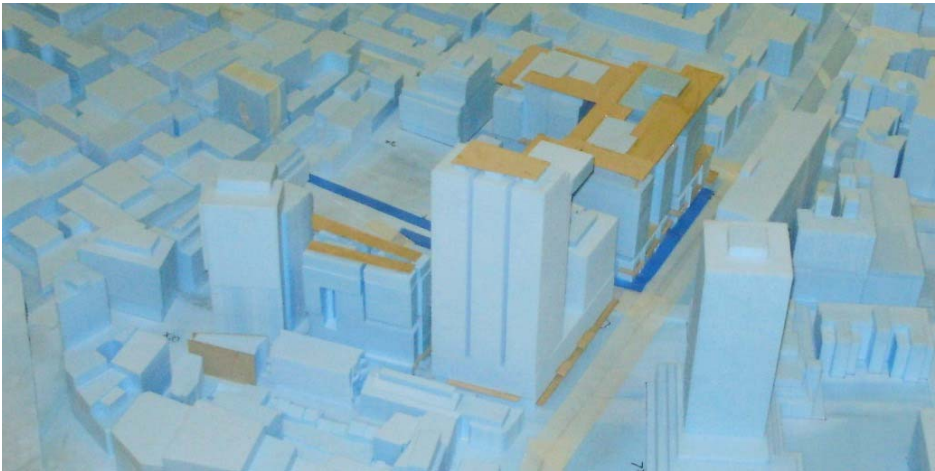
At Location 16, winds from the eastern quadrant are channelled through the gap between Blocks 2 and 5. Near the eastern corners of these blocks, the flow has a large vertical component, as such, Location 15 is less affected by the downwash as it impinges further to the west. The spatial extent of the high wind zone in the vicinity of Location 16 is likely to be reasonably short.

As expected for buildings of this size in an exposed location, wind conditions at higher levels of Block 2 are relatively windy, Figure 5b. These areas will only be used when conditions are considered appropriate. Locations further from the tall tower tend to have calmer conditions. These areas should be suitable for sitting outside for at least 75% of the time.

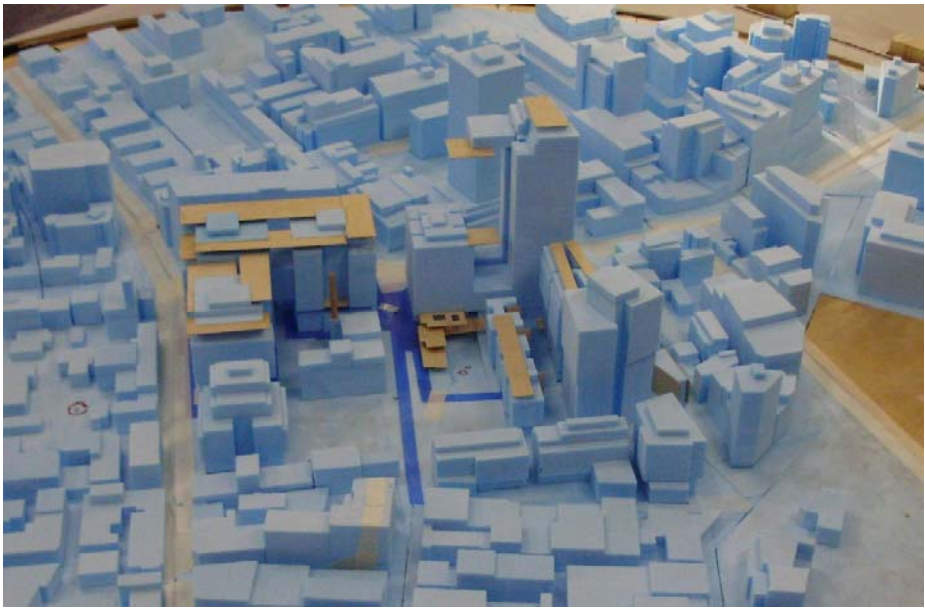
## REFERENCES

- American Society of Civil Engineers (2006), *Minimum Design Loads for Buildings and Other Structures* (ASCE 7-05).
- American Society of Civil Engineers (1999), *Wind Tunnel Model Studies of Buildings and Structures* (ASCE Manual of Practice Number 67).
- Australasian Wind Engineering Society (2001), *Wind Engineering Studies of Buildings* (AWES-QAM-1-2001).
- Cermak, J.E. (1971), "Laboratory Simulation of the Atmospheric Boundary Layer," *AIAA J.*, Vol. 9, September.
- Cermak, J.E. (1975), "Applications of Fluid Mechanics to Wind Engineering," A Freeman Scholar Lecture, *ASME Journal of Fluids Engineering*, Vol. 97, No. 1, March.
- Cermak, J.E. (1976), "Aerodynamics of Buildings," *Annual Review of Fluid Mechanics*, Vol. 8, pp. 75 – 106.
- King, C.V. (1914), "On the Convection of Heat From Small Cylinders in a Stream of Fluid," *Philosophical Transactions of the Royal Society*, London, Vol. A214, p. 373.
- Lawson, T.V. (1990), "The Determination of the Wind Environment of a Building Complex before Construction" Department of Aerospace Engineering, University of Bristol, *Report Number TVL 9025*.
- Penwarden, A.D. (1973), "Acceptable wind speeds in towns", *Building Science*, Vol.8, pp. 259-267.
- Standards Australia (2002), *Australian/New Zealand Standard, Structural Design Actions, Part 2: Wind Actions* (AS/NZS1170 Pt.2).

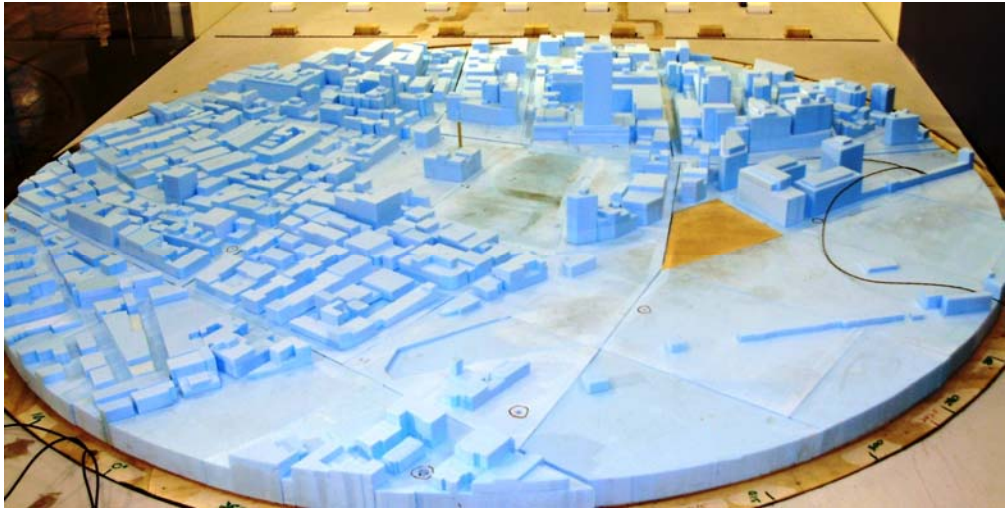
Appendix 1: Additional Photographs of the CPP Wind Tunnel Model



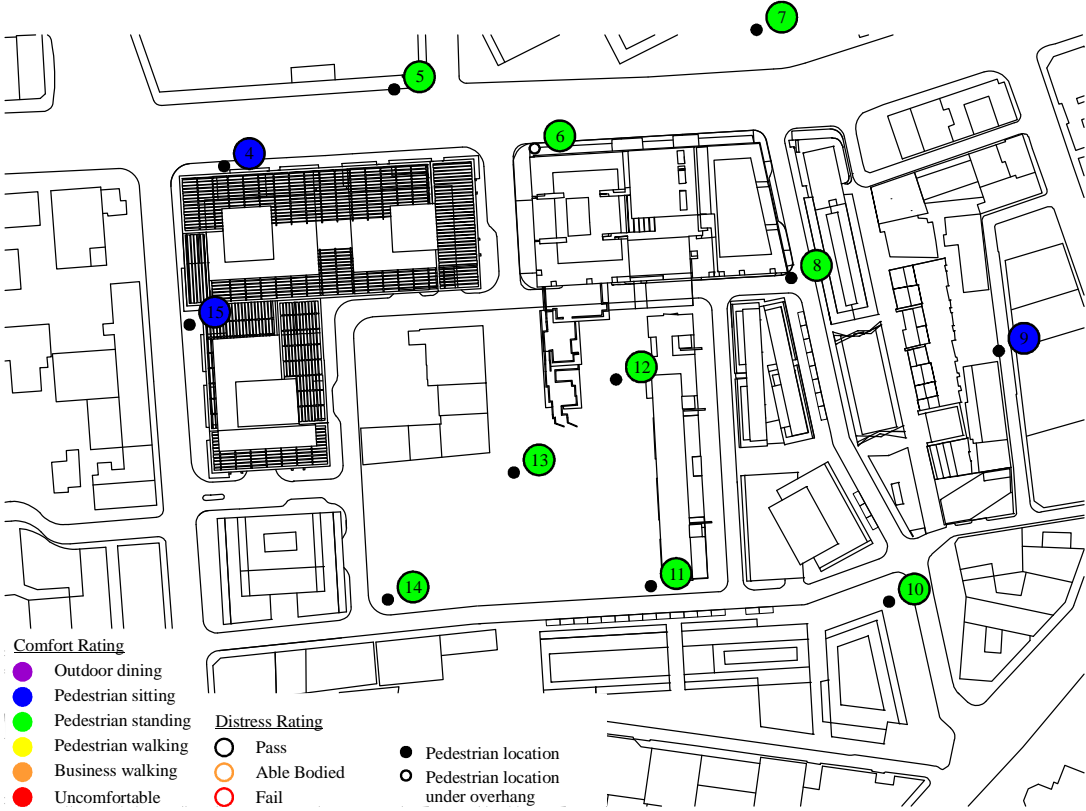
Configuration A: close up of the model from the north-east



Configuration A: close up of the site from the south



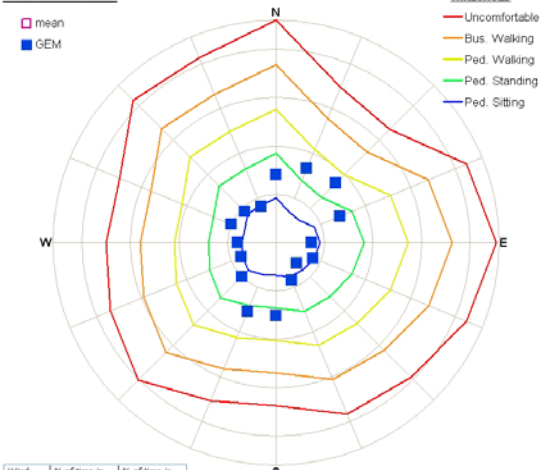
Existing configuration from south-east



Existing wind configuration

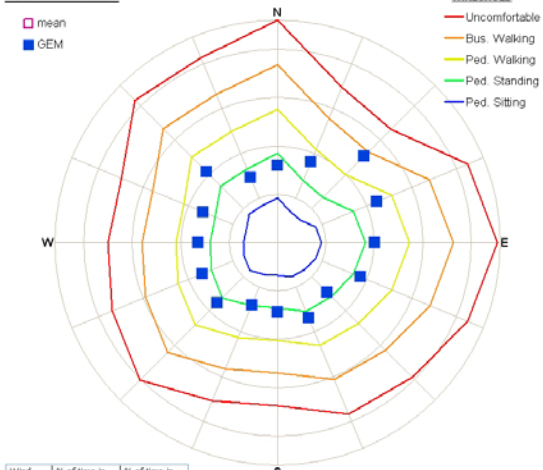
Appendix 2: Directional Wind Results

LOCATION 1



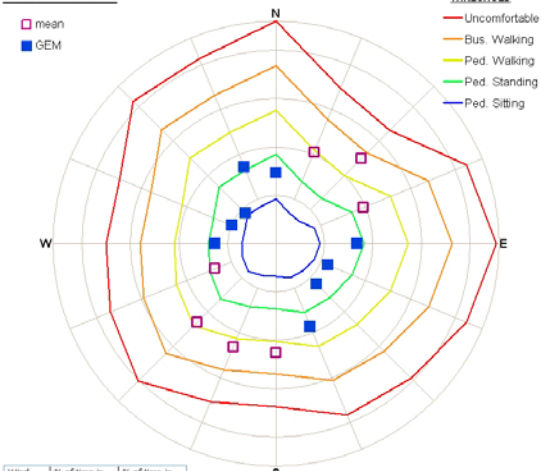
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 14.4                        | 18.5                       |
| 4.0              | 2.4                         | 3.2                        |
| 6.0              | 0.2                         | 0.3                        |
| 8.0              | 0.0                         | 0.0                        |
| 10.0             | 0.0                         | 0.0                        |
| 3.2              | 5.0                         | Ped Sitting                |
| 7.1              | 0.022                       | Pass                       |
| 3.5              | Ped Sitting                 | 5.0                        |
| 7.6              | Pass                        | 0.022                      |

LOCATION 2



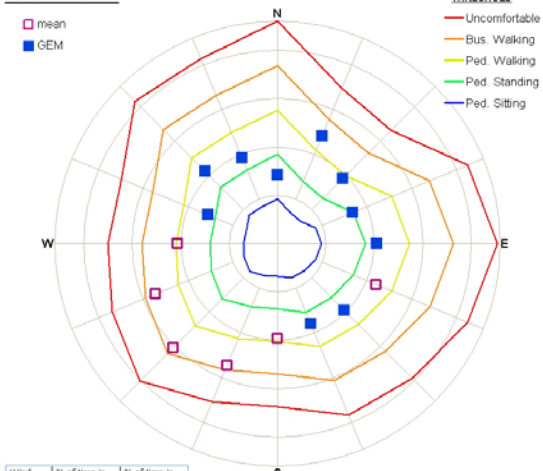
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 25.4                        | 37.1                       |
| 4.0              | 4.6                         | 9.7                        |
| 6.0              | 1.0                         | 2.1                        |
| 8.0              | 0.2                         | 0.4                        |
| 10.0             | 0.0                         | 0.1                        |
| 3.9              | 5.0                         | Ped Sitting                |
| 9.7              | 0.022                       | Pass                       |
| 4.8              | Ped Standing                | 5.0                        |
| 10.8             | Pass                        | 0.022                      |

LOCATION 3



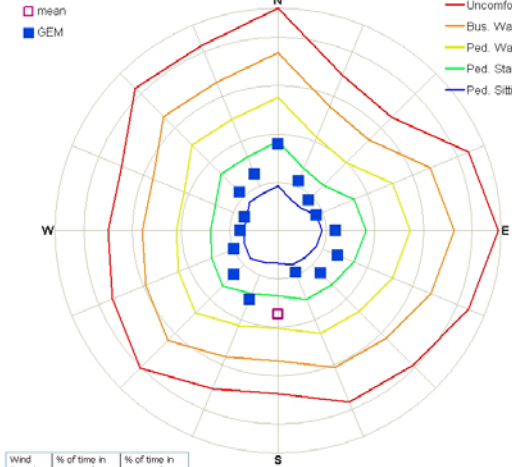
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 30.0                        | 33.5                       |
| 4.0              | 9.9                         | 9.1                        |
| 6.0              | 3.0                         | 2.0                        |
| 8.0              | 0.6                         | 0.3                        |
| 10.0             | 0.1                         | 0.0                        |
| 5.1              | 5.0                         | Ped Standing               |
| 11.0             | 0.022                       | Pass                       |
| 4.8              | Ped Standing                | 5.0                        |
| 10.0             | Pass                        | 0.022                      |

LOCATION 4



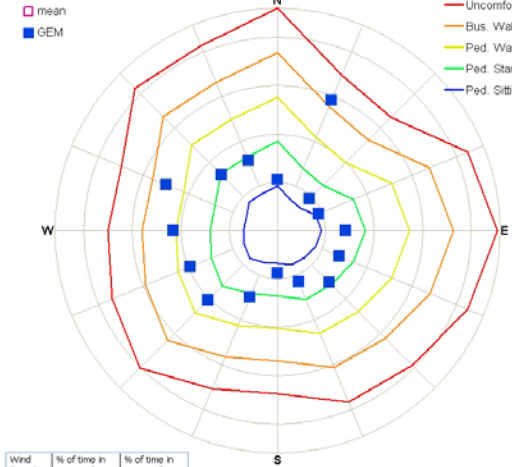
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 39.0                        | 42.2                       |
| 4.0              | 13.6                        | 15.0                       |
| 6.0              | 3.7                         | 3.8                        |
| 8.0              | 0.9                         | 0.8                        |
| 10.0             | 0.2                         | 0.1                        |
| 5.5              | 5.0                         | Ped Standing               |
| 12.7             | 0.022                       | Pass                       |
| 5.5              | Ped Standing                | 5.0                        |
| 12.2             | Pass                        | 0.022                      |

**LOCATION 5**



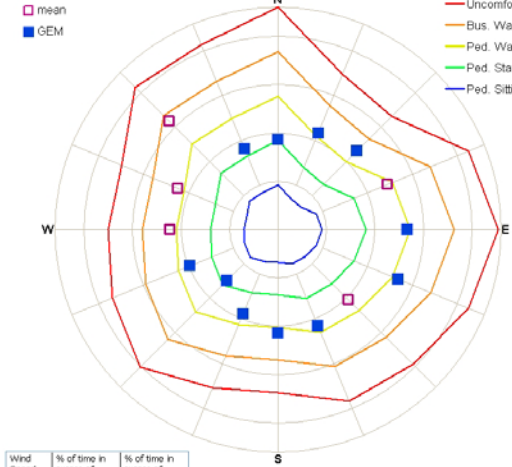
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 15.0                        | 20.2                       |
| 4.0              | 2.1                         | 2.5                        |
| 6.0              | 0.2                         | 0.2                        |
| 8.0              | 0.0                         | 0.0                        |
| 10.0             | 0.0                         | 0.0                        |
| 3.0              | 5.0                         | Ped Sitting                |
| 7.6              | 0.022                       | Pass                       |
| 3.3              | Ped Sitting                 | 5.0                        |
| 7.6              | Pass                        | 0.022                      |

**LOCATION 6**



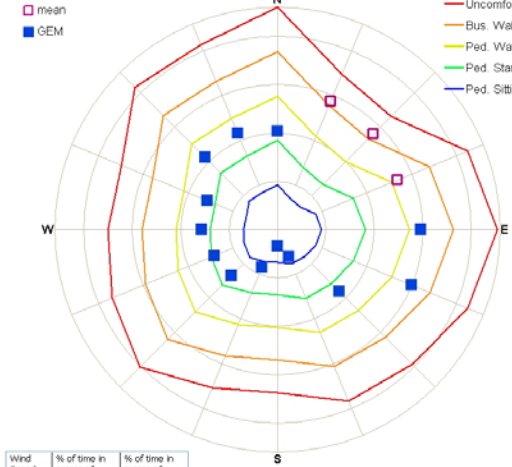
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 18.0                        | 27.9                       |
| 4.0              | 4.7                         | 7.0                        |
| 6.0              | 1.4                         | 2.0                        |
| 8.0              | 0.3                         | 0.6                        |
| 10.0             | 0.0                         | 0.1                        |
| 3.8              | 5.0                         | Ped Sitting                |
| 10.5             | 0.022                       | Pass                       |
| 4.5              | Ped Standing                | 5.0                        |
| 11.7             | Pass                        | 0.022                      |

**LOCATION 7**



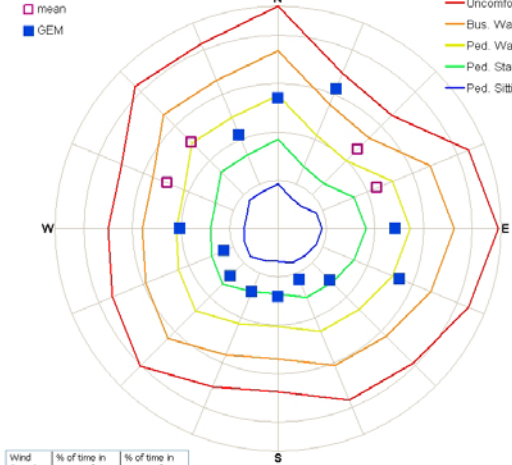
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 42.7                        | 45.3                       |
| 4.0              | 14.9                        | 16.9                       |
| 6.0              | 3.8                         | 4.5                        |
| 8.0              | 0.9                         | 0.8                        |
| 10.0             | 0.2                         | 0.1                        |
| 5.6              | 5.0                         | Ped Standing               |
| 12.8             | 0.022                       | Pass                       |
| 5.8              | Ped Standing                | 5.0                        |
| 12.0             | Pass                        | 0.022                      |

**LOCATION 8**



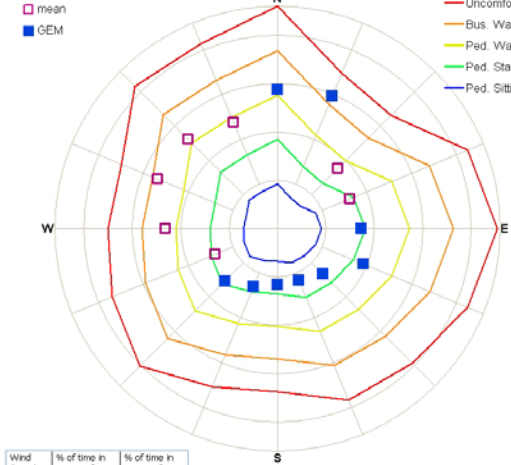
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 27.4                        | 30.9                       |
| 4.0              | 10.1                        | 10.9                       |
| 6.0              | 3.3                         | 3.1                        |
| 8.0              | 1.1                         | 0.7                        |
| 10.0             | 0.3                         | 0.1                        |
| 5.2              | 5.0                         | Ped Standing               |
| 12.7             | 0.022                       | Pass                       |
| 5.2              | Ped Standing                | 5.0                        |
| 12.3             | Pass                        | 0.022                      |

**LOCATION 9**



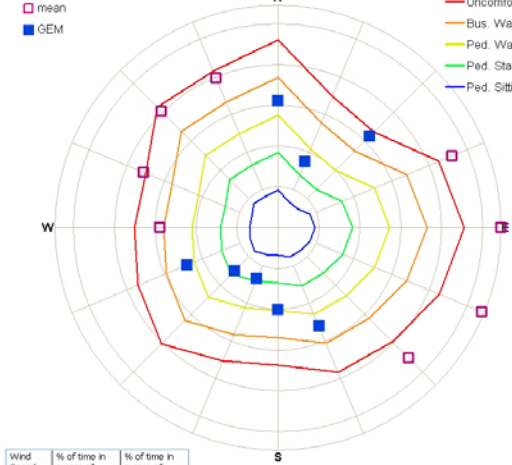
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 37.0                        | 38.7                       |
| 4.0              | 11.3                        | 12.2                       |
| 6.0              | 3.2                         | 3.5                        |
| 8.0              | 0.8                         | 0.9                        |
| 10.0             | 0.2                         | 0.2                        |
| 5.2              | 5.0                         | Ped Standing               |
| 11.7             | 0.022                       | Pass                       |
| 5.4              | Ped Standing                | 5.0                        |
| 12.6             | Pass                        | 0.022                      |

**LOCATION 10**



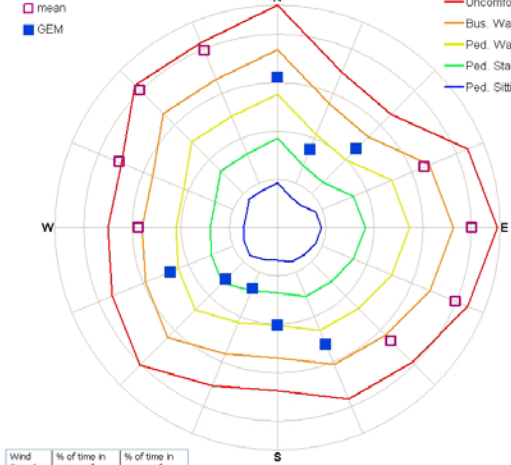
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 34.3                        | 34.7                       |
| 4.0              | 9.2                         | 9.3                        |
| 6.0              | 2.7                         | 2.7                        |
| 8.0              | 0.7                         | 0.7                        |
| 10.0             | 0.2                         | 0.2                        |
| 4.9              | 5.0                         | Ped Standing               |
| 11.9             | 0.022                       | Pass                       |
| 5.0              | Ped Standing                | 5.0                        |
| 12.0             | Pass                        | 0.022                      |

**LOCATION 11**



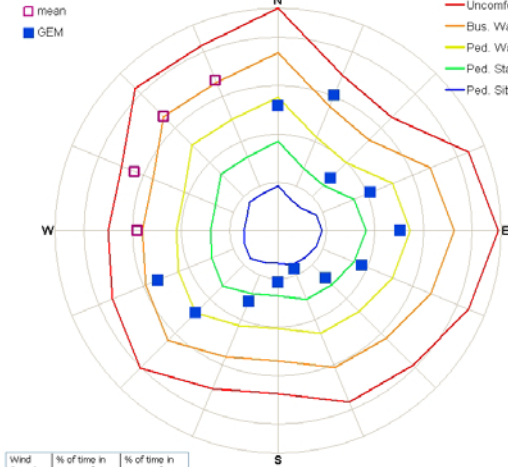
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 48.7                        | 51.2                       |
| 4.0              | 26.2                        | 27.1                       |
| 6.0              | 14.1                        | 12.8                       |
| 8.0              | 7.4                         | 5.3                        |
| 10.0             | 3.6                         | 1.8                        |
| 8.9              | 5.0                         | Bus Walking                |
| 21.6             | 0.022                       | Pass                       |
| 8.1              | Bus Walking                 | 5.0                        |
| 17.9             | Able Body                   | 0.022                      |

**LOCATION 11 EXTENDED AWNINGS**



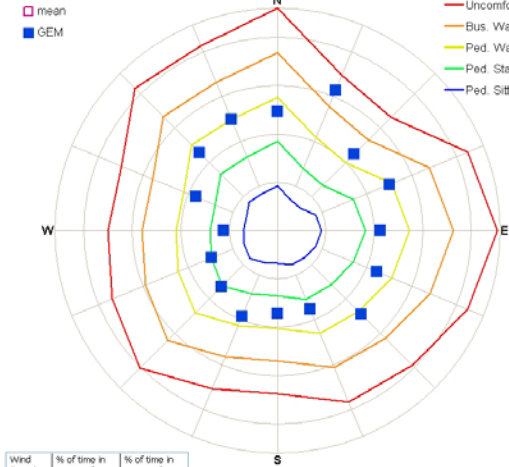
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 46.9                        | 49.6                       |
| 4.0              | 22.2                        | 23.1                       |
| 6.0              | 9.7                         | 8.6                        |
| 8.0              | 3.9                         | 2.4                        |
| 10.0             | 1.5                         | 0.7                        |
| 7.4              | 5.0                         | Ped Walking                |
| 18.0             | 0.022                       | Able Body                  |
| 6.8              | Ped Walking                 | 5.0                        |
| 15.2             | Able Body                   | 0.022                      |

**LOCATION 12**



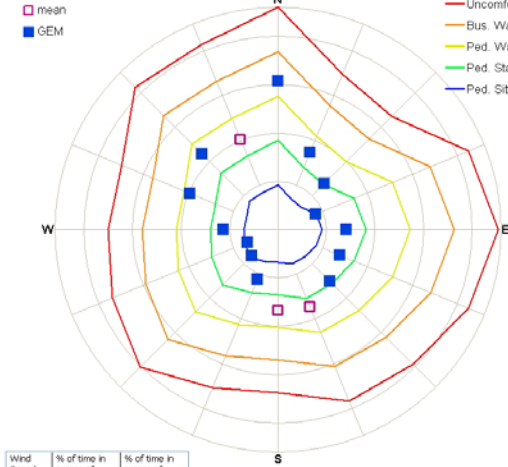
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 30.5                        | 39.5                       |
| 4.0              | 10.9                        | 14.2                       |
| 6.0              | 4.4                         | 5.0                        |
| 8.0              | 1.8                         | 1.7                        |
| 10.0             | 0.6                         | 0.5                        |
| 5.6              | 5.0                         | Ped Standing               |
| 14.7             | 0.022                       | Pass                       |
| 5.9              | Ped Standing                | 5.0                        |
| 14.1             | Pass                        | 0.022                      |

**LOCATION 13**



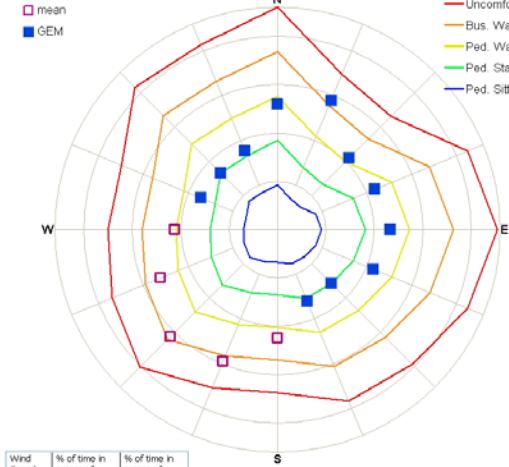
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 32.7                        | 41.7                       |
| 4.0              | 8.2                         | 14.1                       |
| 6.0              | 1.7                         | 3.8                        |
| 8.0              | 0.3                         | 0.8                        |
| 10.0             | 0.0                         | 0.2                        |
| 4.6              | 5.0                         | Ped Standing               |
| 10.4             | 0.022                       | Pass                       |
| 5.6              | Ped Standing                | 5.0                        |
| 12.3             | Pass                        | 0.022                      |

**LOCATION 14**



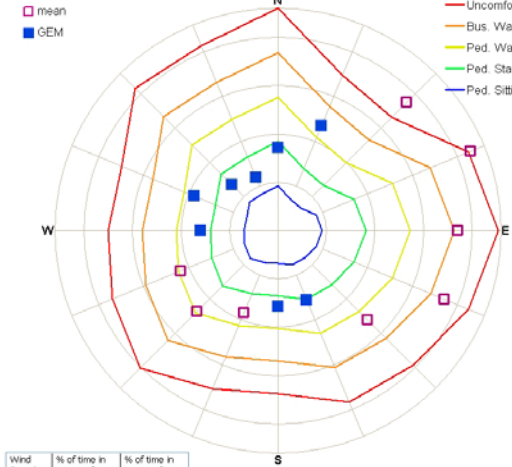
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 24.7                        | 29.3                       |
| 4.0              | 4.9                         | 6.0                        |
| 6.0              | 0.8                         | 1.1                        |
| 8.0              | 0.1                         | 0.2                        |
| 10.0             | 0.0                         | 0.0                        |
| 3.9              | 5.0                         | Ped Sitting                |
| 9.4              | 0.022                       | Pass                       |
| 4.2              | Ped Standing                | 5.0                        |
| 10.3             | Pass                        | 0.022                      |

**LOCATION 15**



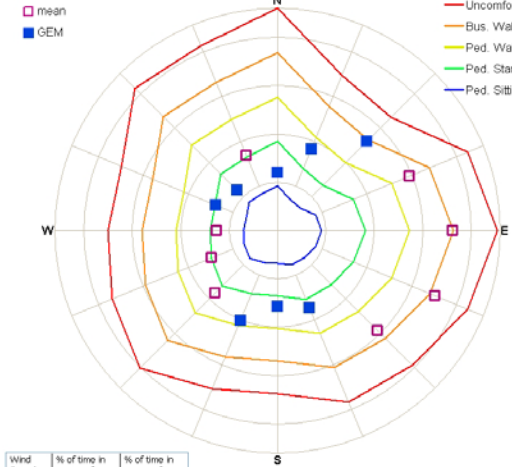
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 40.0                        | 43.1                       |
| 4.0              | 15.3                        | 16.0                       |
| 6.0              | 4.7                         | 4.3                        |
| 8.0              | 1.3                         | 0.9                        |
| 10.0             | 0.3                         | 0.2                        |
| 5.8              | 5.0                         | Ped Standing               |
| 13.2             | 0.022                       | Pass                       |
| 5.7              | Ped Standing                | 5.0                        |
| 12.2             | Pass                        | 0.022                      |

**LOCATION 16**



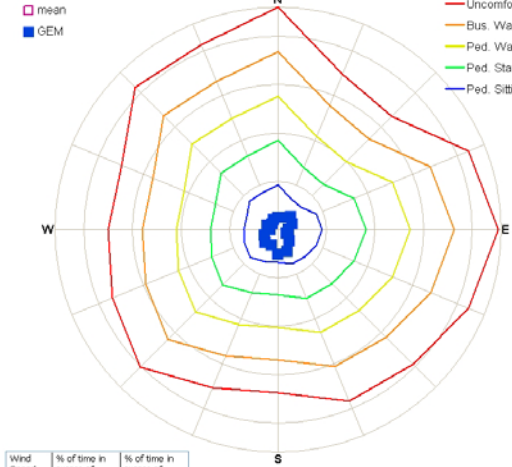
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 38.2                        | 41.6                       |
| 4.0              | 17.0                        | 16.9                       |
| 6.0              | 7.5                         | 5.9                        |
| 8.0              | 3.0                         | 1.9                        |
| 10.0             | 1.3                         | 0.6                        |
| 6.8              | 5.0                         | Ped Walking                |
| 16.6             | 0.022                       | Able Body                  |
| 6.2              | Ped Walking                 | 5.0                        |
| 14.4             | Pass                        | 0.022                      |

**LOCATION 17**



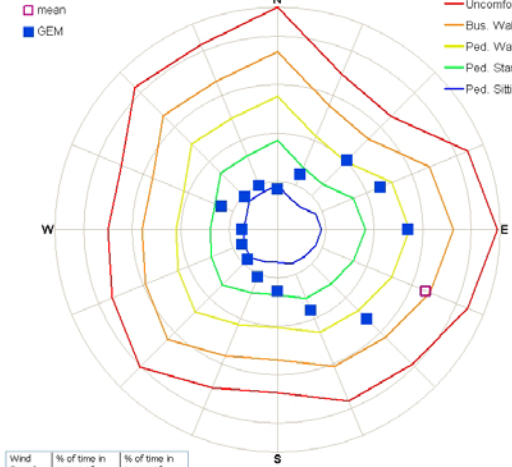
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 37.2                        | 38.5                       |
| 4.0              | 13.4                        | 13.5                       |
| 6.0              | 4.5                         | 3.9                        |
| 8.0              | 1.1                         | 0.9                        |
| 10.0             | 0.3                         | 0.2                        |
| 5.7              | 5.0                         | Ped Standing               |
| 13.9             | 0.022                       | Pass                       |
| 5.6              | Ped Standing                | 5.0                        |
| 12.8             | Pass                        | 0.022                      |

**LOCATION 18**



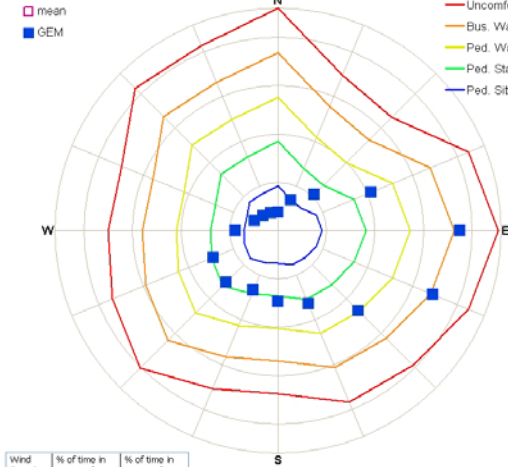
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 0.0                         | 0.1                        |
| 4.0              | 0.0                         | 0.0                        |
| 6.0              | 0.0                         | 0.0                        |
| 8.0              | 0.0                         | 0.0                        |
| 10.0             | 0.0                         | 0.0                        |
| 0.7              | 5.0                         | Outdoor Dinn               |
| 1.5              | 0.022                       | Pass                       |
| 1.0              | Outdoor Dinn                | 5.0                        |
| 2.3              | Pass                        | 0.022                      |

**LOCATION 19**



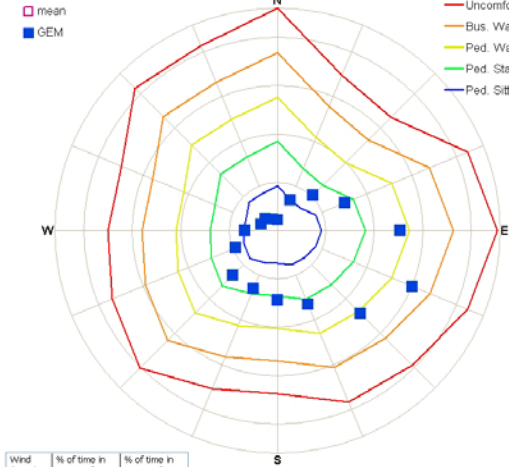
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 22.6                        | 28.5                       |
| 4.0              | 6.2                         | 8.8                        |
| 6.0              | 1.4                         | 2.2                        |
| 8.0              | 0.3                         | 0.4                        |
| 10.0             | 0.1                         | 0.1                        |
| 4.3              | 5.0                         | Ped Standing               |
| 12.1             | 0.022                       | Pass                       |
| 4.8              | Ped Standing                | 5.0                        |
| 12.2             | Pass                        | 0.022                      |

**LOCATION 20**



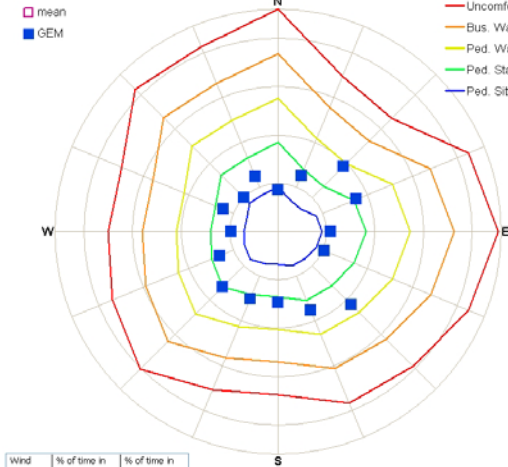
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 15.8                        | 27.2                       |
| 4.0              | 3.8                         | 7.5                        |
| 6.0              | 1.4                         | 2.2                        |
| 8.0              | 0.4                         | 0.6                        |
| 10.0             | 0.1                         | 0.2                        |
| 3.5              | 5.0                         | Ped Sitting                |
| 12.8             | 0.022                       | Pass                       |
| 4.6              | Ped Standing                | 5.0                        |
| 13.6             | Pass                        | 0.022                      |

**LOCATION 21**



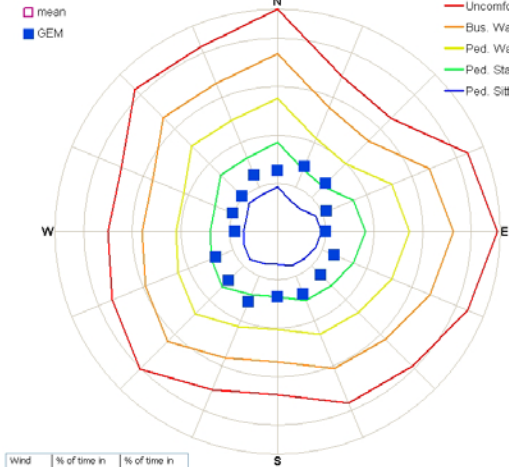
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 14.4                        | 23.8                       |
| 4.0              | 2.3                         | 5.7                        |
| 6.0              | 0.4                         | 1.2                        |
| 8.0              | 0.1                         | 0.2                        |
| 10.0             | 0.0                         | 0.1                        |
| 3.1              | 5.0                         | Ped Sitting                |
| 9.8              | 0.022                       | Pass                       |
| 4.1              | Ped Standing                | 5.0                        |
| 11.3             | Pass                        | 0.022                      |

**LOCATION 22**



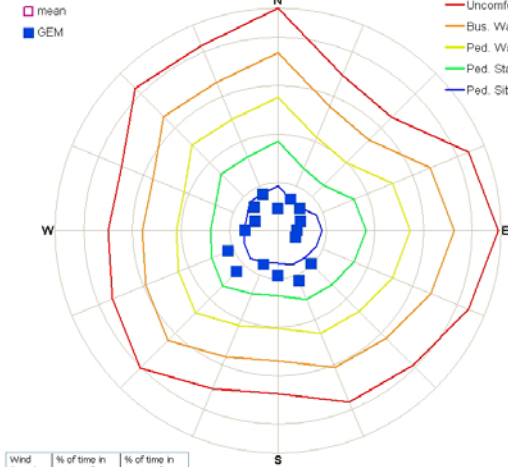
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 14.6                        | 28.8                       |
| 4.0              | 1.0                         | 5.9                        |
| 6.0              | 0.0                         | 0.7                        |
| 8.0              | 0.0                         | 0.1                        |
| 10.0             | 0.0                         | 0.0                        |
| 2.9              | 5.0                         | Ped Sitting                |
| 6.3              | 0.022                       | Pass                       |
| 4.1              | Ped Standing                | 5.0                        |
| 9.0              | Pass                        | 0.022                      |

**LOCATION 23**



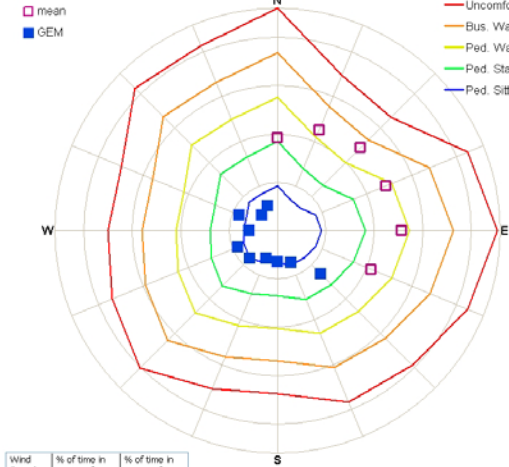
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 9.6                         | 23.8                       |
| 4.0              | 0.2                         | 2.7                        |
| 6.0              | 0.0                         | 0.1                        |
| 8.0              | 0.0                         | 0.0                        |
| 10.0             | 0.0                         | 0.0                        |
| 2.4              | 5.0                         | Ped Sitting                |
| 4.9              | 0.022                       | Pass                       |
| 3.5              | Ped Sitting                 | 5.0                        |
| 7.0              | Pass                        | 0.022                      |

**LOCATION 24**



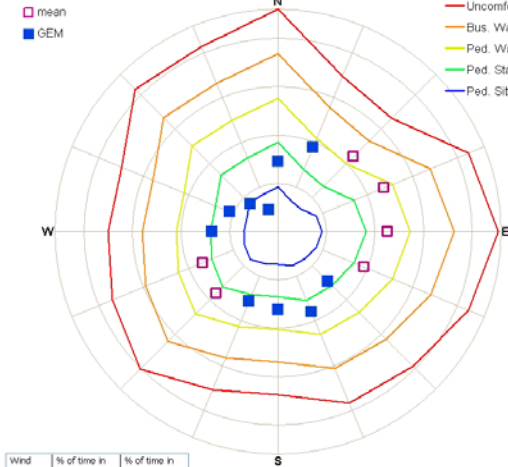
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 1.2                         | 8.1                        |
| 4.0              | 0.0                         | 0.2                        |
| 6.0              | 0.0                         | 0.0                        |
| 8.0              | 0.0                         | 0.0                        |
| 10.0             | 0.0                         | 0.0                        |
| 1.5              | 5.0                         | Outdoor Dinn               |
| 3.4              | 0.022                       | Pass                       |
| 2.3              | Ped Sitting                 | 5.0                        |
| 5.2              | Pass                        | 0.022                      |

**LOCATION 25**



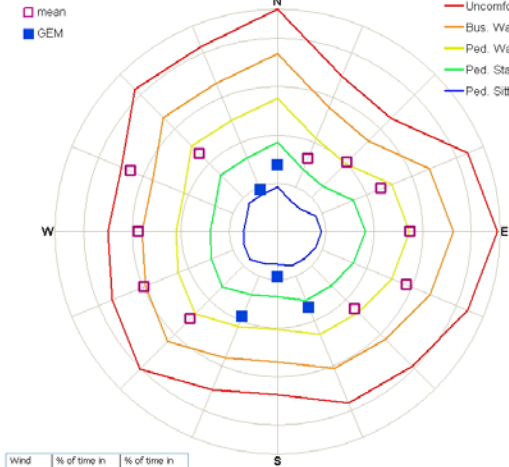
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 16.6                        | 18.2                       |
| 4.0              | 6.3                         | 4.8                        |
| 6.0              | 1.8                         | 1.1                        |
| 8.0              | 0.4                         | 0.2                        |
| 10.0             | 0.1                         | 0.0                        |
| 4.3              | 5.0                         | Ped Standing               |
| 10.7             | 0.022                       | Pass                       |
| 3.9              | Ped Sitting                 | 5.0                        |
| 9.4              | Pass                        | 0.022                      |

**LOCATION 26**



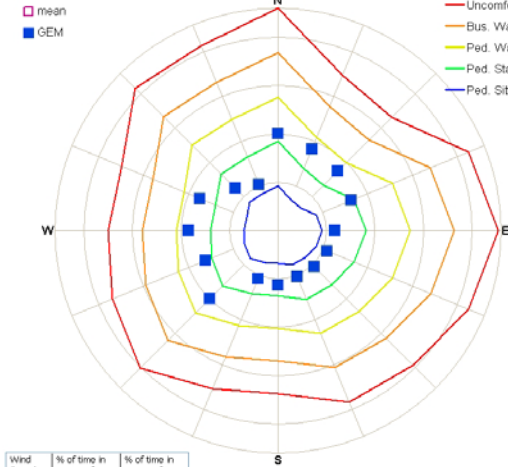
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 30.7                        | 32.9                       |
| 4.0              | 7.1                         | 7.7                        |
| 6.0              | 1.2                         | 1.3                        |
| 8.0              | 0.2                         | 0.2                        |
| 10.0             | 0.0                         | 0.0                        |
| 4.4              | 5.0                         | Ped Standing               |
| 9.6              | 0.022                       | Pass                       |
| 4.5              | Ped Standing                | 5.0                        |
| 9.4              | Pass                        | 0.022                      |

**LOCATION 27**



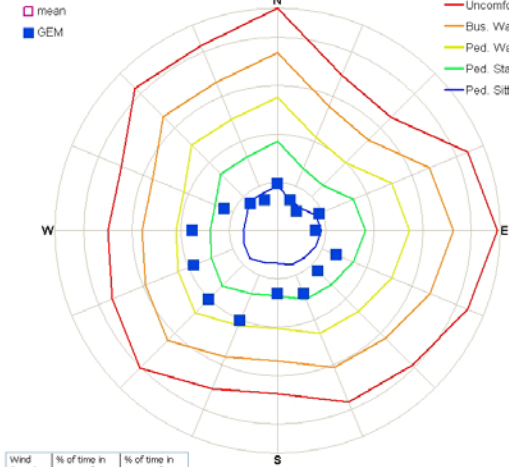
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 36.9                        | 38.9                       |
| 4.0              | 15.2                        | 13.4                       |
| 6.0              | 5.3                         | 3.7                        |
| 8.0              | 1.6                         | 1.0                        |
| 10.0             | 0.5                         | 0.3                        |
| 6.0              | 5.0                         | Ped Walking                |
| 14.6             | 0.022                       | Pass                       |
| 5.5              | Ped Standing                | 5.0                        |
| 13.3             | Pass                        | 0.022                      |

**LOCATION 28**



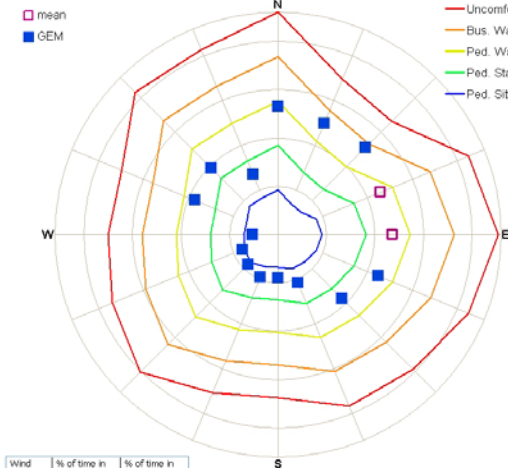
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 18.4                        | 26.8                       |
| 4.0              | 2.9                         | 5.4                        |
| 6.0              | 0.2                         | 0.8                        |
| 8.0              | 0.0                         | 0.1                        |
| 10.0             | 0.0                         | 0.0                        |
| 3.4              | 5.0                         | Ped Sitting                |
| 7.5              | 0.022                       | Pass                       |
| 4.0              | Ped Standing                | 5.0                        |
| 8.9              | Pass                        | 0.022                      |

**LOCATION 29**



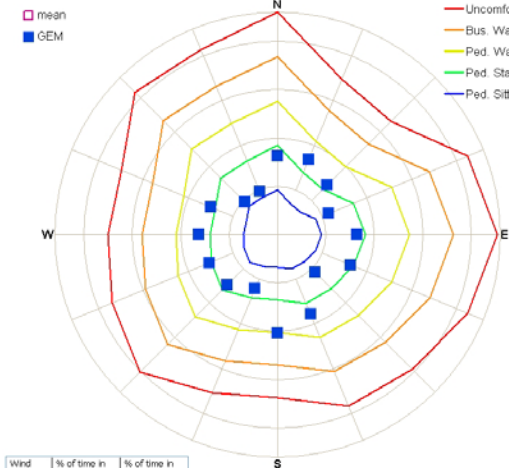
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 12.4                        | 21.4                       |
| 4.0              | 1.9                         | 4.1                        |
| 6.0              | 0.2                         | 0.6                        |
| 8.0              | 0.0                         | 0.1                        |
| 10.0             | 0.0                         | 0.0                        |
| 2.9              | 5.0                         | Ped Sitting                |
| 7.9              | 0.022                       | Pass                       |
| 3.8              | Ped Sitting                 | 5.0                        |
| 9.0              | Pass                        | 0.022                      |

**LOCATION 30**



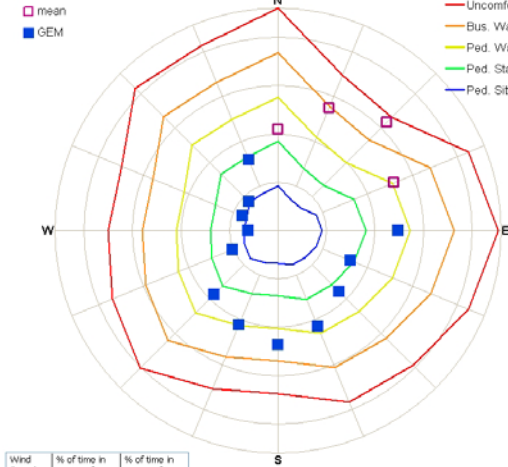
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 20.9                        | 28.2                       |
| 4.0              | 7.0                         | 9.1                        |
| 6.0              | 2.0                         | 2.5                        |
| 8.0              | 0.5                         | 0.6                        |
| 10.0             | 0.1                         | 0.1                        |
| 4.5              | 5.0                         | Ped Standing               |
| 11.0             | 0.022                       | Pass                       |
| 4.9              | Ped Standing                | 5.0                        |
| 11.2             | Pass                        | 0.022                      |

**LOCATION 31**



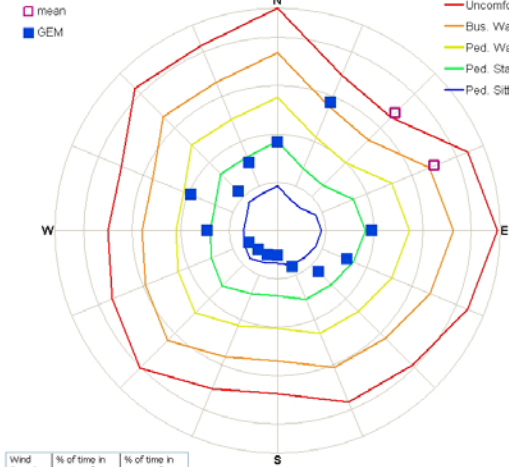
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 20.5                        | 30.4                       |
| 4.0              | 3.0                         | 6.5                        |
| 6.0              | 0.2                         | 0.9                        |
| 8.0              | 0.0                         | 0.1                        |
| 10.0             | 0.0                         | 0.0                        |
| 3.5              | 5.0                         | Ped Sitting                |
| 7.4              | 0.022                       | Pass                       |
| 4.2              | Ped Standing                | 5.0                        |
| 9.2              | Pass                        | 0.022                      |

**LOCATION 32**



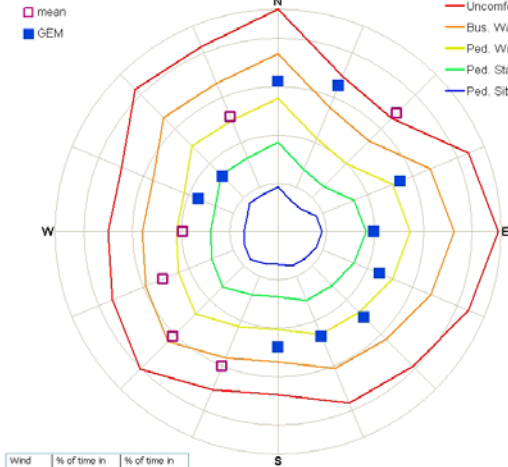
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 30.0                        | 36.4                       |
| 4.0              | 10.3                        | 13.2                       |
| 6.0              | 3.6                         | 3.9                        |
| 8.0              | 1.3                         | 1.0                        |
| 10.0             | 0.4                         | 0.2                        |
| 5.3              | 5.0                         | Ped Standing               |
| 13.4             | 0.022                       | Pass                       |
| 5.6              | Ped Standing                | 5.0                        |
| 11.0             | Pass                        | 0.022                      |

**LOCATION 33**



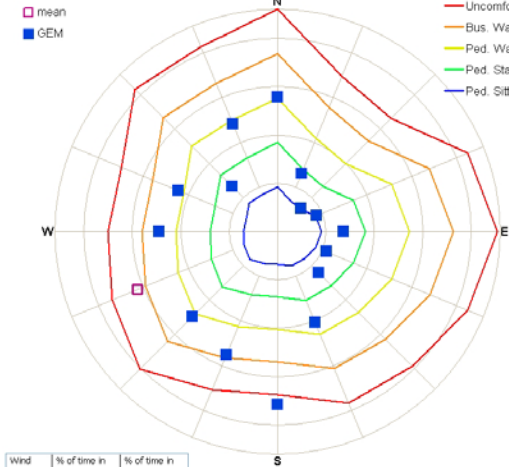
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 19.5                        | 23.5                       |
| 4.0              | 7.8                         | 8.2                        |
| 6.0              | 3.8                         | 3.0                        |
| 8.0              | 1.7                         | 1.0                        |
| 10.0             | 0.7                         | 0.2                        |
| 5.2              | 5.0                         | Ped Standing               |
| 14.5             | 0.022                       | Pass                       |
| 4.9              | Ped Standing                | 5.0                        |
| 12.3             | Pass                        | 0.022                      |

**LOCATION 34**



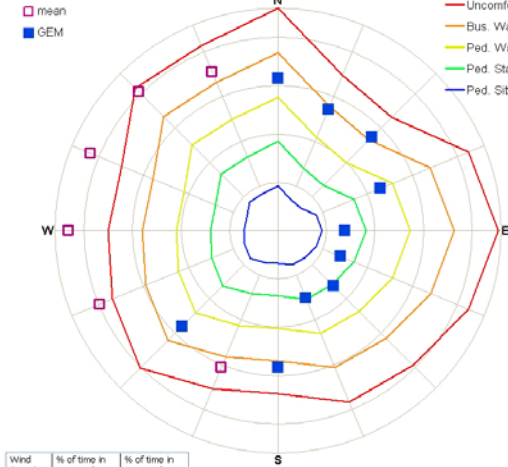
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 45.2                        | 47.4                       |
| 4.0              | 20.3                        | 22.0                       |
| 6.0              | 7.3                         | 7.8                        |
| 8.0              | 2.5                         | 2.4                        |
| 10.0             | 0.6                         | 0.6                        |
| 6.7              | 5.0                         | Ped Walking                |
| 14.9             | 0.022                       | Pass                       |
| 6.7              | Ped Walking                 | 5.0                        |
| 13.7             | Pass                        | 0.022                      |

**LOCATION 35**



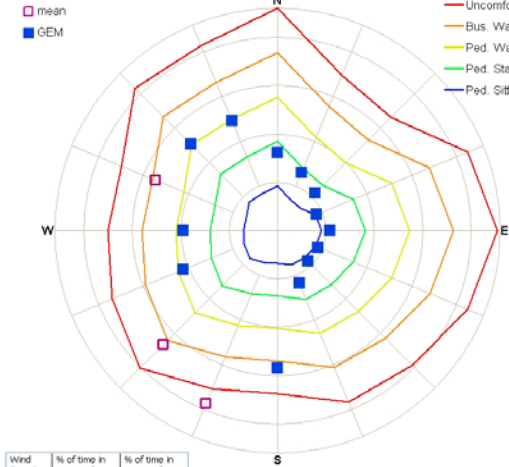
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 29.9                        | 35.6                       |
| 4.0              | 12.6                        | 15.7                       |
| 6.0              | 5.2                         | 6.6                        |
| 8.0              | 1.9                         | 2.6                        |
| 10.0             | 0.6                         | 0.9                        |
| 6.0              | 5.0                         | Ped Standing               |
| 14.6             | 0.022                       | Pass                       |
| 6.5              | Ped Walking                 | 5.0                        |
| 15.7             | Able Body                   | 0.022                      |

**LOCATION 36**



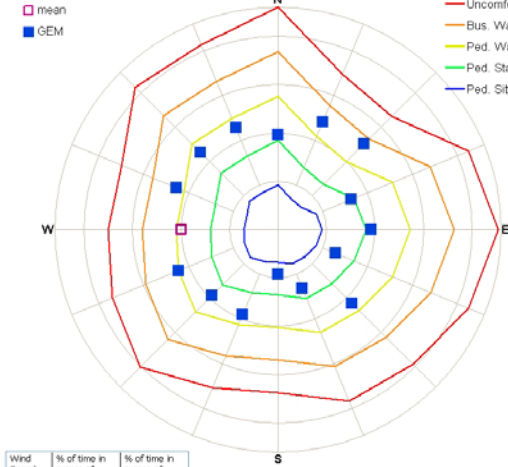
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 46.5                        | 49.6                       |
| 4.0              | 22.1                        | 24.6                       |
| 6.0              | 10.3                        | 11.4                       |
| 8.0              | 5.1                         | 4.8                        |
| 10.0             | 2.5                         | 1.8                        |
| 7.9              | 5.0                         | Ped Walking                |
| 20.0             | 0.022                       | Fail                       |
| 7.8              | Ped Walking                 | 5.0                        |
| 17.3             | Able Body                   | 0.022                      |

**LOCATION 37**



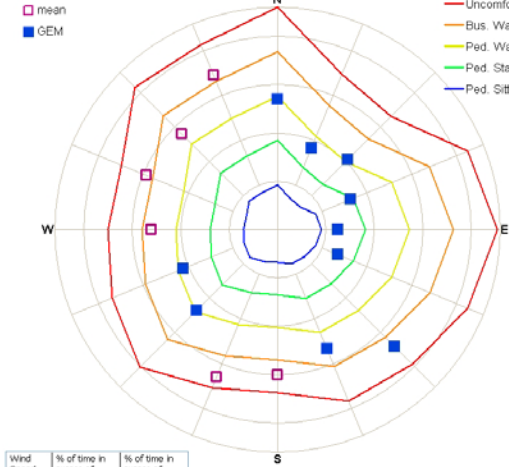
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 28.5                        | 33.8                       |
| 4.0              | 11.3                        | 14.0                       |
| 6.0              | 4.5                         | 6.0                        |
| 8.0              | 1.6                         | 2.2                        |
| 10.0             | 0.7                         | 0.7                        |
| 5.7              | 5.0                         | Ped Standing               |
| 15.6             | 0.022                       | Able Body                  |
| 6.3              | Ped Walking                 | 5.0                        |
| 14.9             | Pass                        | 0.022                      |

**LOCATION 38**



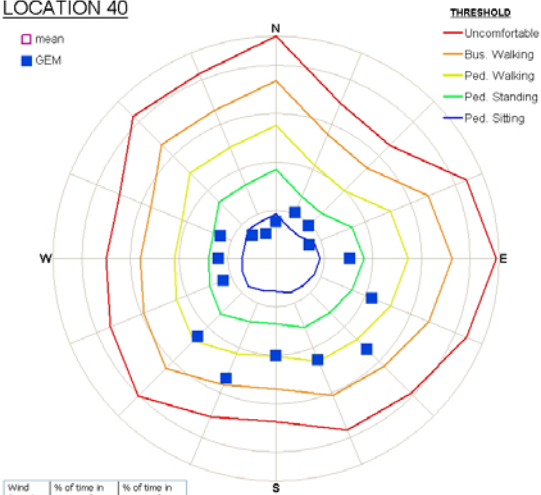
| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 30.1                        | 37.5                       |
| 4.0              | 9.5                         | 12.4                       |
| 6.0              | 2.4                         | 3.5                        |
| 8.0              | 0.4                         | 0.8                        |
| 10.0             | 0.0                         | 0.1                        |
| 14.9             | 5.0                         | Ped Standing               |
| 10.5             | 0.022                       | Pass                       |
| 5.4              | Ped Standing                | 5.0                        |
| 11.3             | Pass                        | 0.022                      |

**LOCATION 39**



| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 43.8                        | 46.9                       |
| 4.0              | 20.2                        | 22.6                       |
| 6.0              | 8.0                         | 8.6                        |
| 8.0              | 2.8                         | 2.8                        |
| 10.0             | 0.9                         | 0.7                        |
| 6.8              | 5.0                         | Ped Walking                |
| 14.8             | 0.022                       | Pass                       |
| 6.9              | Ped Walking                 | 5.0                        |
| 14.7             | Pass                        | 0.022                      |

LOCATION 40



| Wind Speed (m/s) | % of time in excess of Mean | % of time in excess of GEM |
|------------------|-----------------------------|----------------------------|
| 2.0              | 23.0                        | 30.0                       |
| 4.0              | 5.8                         | 9.7                        |
| 6.0              | 1.3                         | 2.6                        |
| 8.0              | 0.2                         | 0.5                        |
| 10.0             | 0.0                         | 0.1                        |
| 4.2              | 5.0                         | Ped Standing               |
| 10.8             | 0.022                       | Pass                       |
| 4.9              | Ped Standing                | 5.0                        |
| 11.0             | Pass                        | 0.022                      |