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Final Report

Pedestrian Level Wind Microclimate Assessment
Wind Tunnel Study

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B	23 April 2012	All	W. Pearce

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S. Carmichael

OBJECTIVE

The objective of this study was to provide a pedestrian level wind microclimate assessment, based on a series of wind tunnel tests, for the proposed Centrepoint development in London. This report presents a description of the methodology used, the main wind tunnel test results for the proposed development, baseline and cumulative scenarios for both the windiest (generally winter) and summer seasons. Results are presented in terms of the well-known Lawson Comfort Criteria.

1. Summary

Wind tunnel tests were conducted on a 1:300 scale model of the proposed Centrepoint development (referred to as the Proposed Development in the rest of this report) in central London, United Kingdom. The investigation quantifies the wind conditions within and around the Site, by comparing the measured wind speed and frequency of occurrence with the well-established Lawson Comfort Criteria.

Measurements covered ground level locations along the building facades, at corners and near main entrances, on pedestrian routes within and around the Site and within open amenity spaces at ground level and on selected terraces. Analysis was conducted on a seasonal basis but the report focuses on the worst case results (or the windiest season) and those for the summer season, when pedestrian activity generally requires calmer conditions.

Three configurations of the wind tunnel model were tested:

- Configuration 1: The existing development with existing surrounding buildings;
- Configuration 2: Proposed Development with existing surrounding buildings; and
- Configuration 3: Proposed Development with cumulative surrounding buildings.

The wind tunnel tests have been conducted on a model devoid of trees or landscape detail in order to obtain conservative results (i.e. generate a relatively windy microclimate). In general, planting and other landscape enhancements would increase shelter within the Proposed Development compared to the wind conditions described in sections of this report, particularly when the trees and plants are established and in full leaf.

Meteorological data for London has been analysed and adjusted to the Site conditions by modelling the effect of terrain roughness on the wind speeds approaching the Site. Results are presented in a series of 'dot-plots' to indicate the measured comfort criteria for the windiest and summer seasons for each configuration.

The overall conclusion from the assessment is that the wind microclimate around the Proposed Development is compatible with the intended pedestrian use of the Site. Additional mitigation measures have not been recommended, as they are not considered necessary.

2. Site Description

2.1 Existing Site and Surroundings

The OS Landranger reference grid for the site is TQ298813. The site is bounded by New Oxford Street to the north, Charing Cross Road to the west, St Giles high Street to the south and Earnshaw Street to the east. The immediate surrounding buildings are mid-rise and in the range of 5- to 9-storeys. Figure 1 shows an aerial view of the site with an approximate site location highlighted in yellow.

The Site comprises the existing Centrepoint Landmark Tower and the lower-rise buildings which extend eastward from Centrepoint Tower and then turn southwards along Earnshaw Street.

2.2 Proposed Development

The Proposed Development retains the Centrepoint Tower, but with a change of use, and incorporates changes to the lower-rise buildings. Appendix A shows a selection of photographs of the wind tunnel model used in this assessment.

3. Wind Tunnel Testing: Procedure and Methodology

The basic methodology for quantifying the pedestrian level wind environment is outlined below:

- Measure the wind speeds at pedestrian level in the wind tunnel relative to a reference wind speed;
- Adjust standard meteorological data to account for conditions at the Site;
- Combine these to obtain the expected frequency and magnitude of wind speeds at pedestrian level; and
- Compare the results with the Lawson Comfort Criteria to 'grade' conditions around the Site.

3.1 Simulation of Atmospheric Winds

The wind is turbulent, or gusty, and this turbulence varies depending upon the site. It is necessary to reflect these characteristics in the wind tunnel test. In addition, the atmospheric boundary layer is a shear flow which means that the mean wind speed increases with height. Modeling these effects is achieved by a combination of grid, barrier and floor roughness elements to create a naturally-grown boundary layer that is representative of urban or open country conditions, as appropriate. The detailed contoured proximity model around the Site is used to fine-tune the flow and create conditions similar to those expected at full-scale.

3.2 Measurement Technique

Wind speed measurements were made using Irwin probes. These probes measure the pressure at a scaled 1.5m height above ground and also at the surface, from which the wind speed is obtained using a calibrated relationship. For pedestrian comfort studies, the mean wind speed is required as well as a measure of the peak wind speed at each measurement location. The typical equivalent full scale time period for measuring the mean wind speed is around 15 minutes, whereas the peak wind speed is taken as the wind speed exceeded for 1% of the time.

Wind speeds at each location were measured for all wind directions with 0° representing a wind blowing from the north and 90° a wind blowing from the east.

3.3 Scaling

The length scale of the model was 1:300 and the velocity scale was approximately 1:2 for strong winds. Consequently the time scale for the tests was 1:150, or in other words 1 second in the wind tunnel is equivalent to 150 seconds at full scale.

3.4 Meteorological Data

Meteorological data derived from the main airport meteorological stations in London have been corrected to standard conditions of 10m above open flat level country terrain. The meteorological station data is then adjusted to the site conditions using the methodology implemented in the BREVe3 software package.

The meteorological data for London used in this report are presented in Appendix B as wind roses by season (refer to Figure 19) with the wind speed divided into Beaufort Force ranges (see Table 4, Appendix C). The radial axis indicates the cumulative number of hours per season that the wind speed exceeds the particular Beaufort Force. The seasons are defined as spring (March, April, May), summer (June, July and August), autumn (September, October, November) and winter (December, January, February).

The meteorological data indicate that the prevailing wind direction throughout the year is from the south-west. This is typical for many areas of southern England. There is a secondary peak from north easterly winds, especially during the spring, and these tend to be cold winds.

The combination of meteorological data, site altitude and velocity ratios permits the percentage of time that wind speeds are exceeded at ground level on the site to be evaluated. The locations can then be assessed using 'comfort criteria', as described below.

3.5 Pedestrian Comfort

The assessment of the wind conditions requires a standard against which the measurements can be compared. This report uses the Lawson Criteria, which have been established for some thirty years and have been widely used on building developments across the United Kingdom. The comfort

criteria, seek to define the reaction of an average pedestrian to the wind, are described in Table 3 and illustrated in Figure 20 (both found in Appendix C). If the measured wind conditions exceed the threshold then conditions are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area for its intended purpose.

The criteria set out six pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. The six categories are sitting, standing, entering/leaving a building, leisure walking, business walking and roadway/car-park, in ascending order of activity level. In other words, the wind conditions in an area for sitting need to be calmer than a location that people merely walk past. The distinction between leisure walking and business walking is that in the business scenario, where pedestrians are on site because their livelihood depends upon it, they will be more tolerant of stronger winds.

The criteria are derived for open air conditions and assume that pedestrians will be suitably dressed for the season (in other words thermal comfort is not considered).

3.6 Strong Winds

The Lawson Comfort Criteria also specify a lower limit strong wind criterion when winds exceed Beaufort Force 6. Notification of exceedence greater than one hour in the year is required. Exceedence of this criterion may indicate a need for remedial measures or a careful assessment of the expected use of that location, e.g. is it reasonable to expect vulnerable pedestrians to be present at the location on the windiest day of the year?

In the UK, stronger winds are associated with areas which would be classified as suitable for business walking or roadway use. In a mixed-use, urban development, business walking and roadway conditions would not usually form part of the 'target' wind environment and would usually require mitigation due to pedestrian comfort considerations. This mitigation would also reduce the frequency of, or even eliminate, any strong winds.

For locations where the wind speed exceeds Beaufort Force 6, which are found on a pedestrian thoroughfare, the results are unlikely to generate nuisance to pedestrians. However, where there is an exceedence of Beaufort Force 7 or 8, we would expect pedestrians to experience difficulty in walking.

If the wind speed exceeds B6 in a proposed external seating area or outside an entrance, these conditions would be unacceptable and would require mitigation. However, if the wind speed exceeded B6 then the area is likely to be classified as suitable for leisure walking, business walking or roadway use and so would require mitigation to satisfy the Lawson Comfort Criteria in any case.

It is RWDI's practice to report when B6, B7 and B8 are exceeded for more than 1 hour per annum. The results for this study are presented in Table 2 which also shows the wind direction that contributes most to the strong winds.

4. RESULTS

4.1 Details of the Analysis

To account for the difference in height and roughness between meteorological conditions at the airport and the site it is necessary to apply correction factors to the wind tunnel velocity ratios. Correction factors (mean factors) were computed for a full range of wind directions from 0° through to 360°. The reference height in the wind tunnel was at the equivalent full-scale height of 120 metres. Table 1 presents the mean factors for the Centrepoint Site.

4.2 The Desired Pedestrian Activity around the Proposed Development

Generally, for a mixed use development the target conditions are as follows: leisure walking during the windiest season on pedestrian thoroughfares; standing/entrance conditions at main entrances, pick-up/drop-off points throughout the year, and sitting at outdoor seating and amenity areas during the summer season when these areas are more likely to be frequently used by pedestrians.

4.3 Performance Against the Lawson Criteria

Appendix D presents Tables of the comfort criteria around the Existing Site (Configuration 1) and the Proposed Development with the existing (Configuration 2) and cumulative (Configuration 3) surrounds scenarios, for all seasons. The results presented in Figures 3 to 14 are extracted from Appendix D.

5. Discussion

5.1 Baseline Assessment

5.1.1 Configuration 1: The existing development with existing surrounding buildings

Figure 3 and Figure 4 show the windiest and summer season results for the Baseline scenario at ground level whereas Figure 5 and Figure 6 show the equivalent results at the terrace levels. Wind speeds were measured at a total of 56 ground level locations within and around the Site and 10 locations at the elevated terrace level.

The wind microclimate at all locations, for the windiest season (typically winter), is summarised as follows:

- Fourteen locations are suitable for sitting;
- Thirty-two locations are suitable for standing; and
- Ten locations are suitable for leisure walking.

For the terrace locations there were:

- Four locations suitable for sitting;
- Five locations suitable for standing; and
- One location suitable for leisure walking.

The baseline wind microclimate within and around the Site is predominantly suitable for standing/entrance use and sitting during the windiest season. However, there are windier areas, where the wind microclimate is suitable for leisure walking at locations 3, 14, 26, 27, 28, 34, 35, 36 and 38 at ground level and location 58 on the terrace level. The greatest concentration of locations where the wind microclimate is classified as suitable for leisure walking occurs at the southern corner of the Centrepoint Tower.

Throughout the summer months, most locations are suitable for sitting because the winds are lighter in the summer (Figure 4 and Figure 6). There is a cluster of locations to the south of the Tower where the wind microclimate is suitable for standing and then isolated areas at the northwest corner of the Tower, on New Oxford Street and on Earnshaw Street.

Occurrence of Strong Winds

For Configuration 1, annually the wind speed exceeds Beaufort Force 6, on occasion, at locations 3, 27, 28, 34, 38 and 50 for up to 4.8 hours per year. There are no locations where the wind speed exceeds Beaufort Force 7 or 8 for more than 1.0 hour per year. These results are listed in Table 2.

5.2 Proposed Development Assessment

5.2.1 Configuration 2: Proposed development and existing surrounding buildings

Figure 7 and Figure 8 show the windiest and summer season results, at ground level, for the Proposed Development with existing surrounds. Figure 9 and Figure 10 show the equivalent results on the terrace levels. Wind speeds were measured at 56 ground level locations within and around the Site and at 10 terrace locations on the Site.

The wind microclimate at all ground level locations, for the windiest season (typically winter), is summarised as follows:

- Eighteen locations are suitable for sitting,
- Twenty-seven locations are suitable for standing and
- Eleven locations are suitable for leisure walking

For the sensor locations at terrace level there were:

- Five locations suitable for sitting,
- Four locations suitable for standing and
- One location suitable for leisure walking

The windiest season (i.e. winter) wind conditions at ground level for the Proposed Development with existing surrounding buildings are suitable for a mix of sitting, standing or leisure walking at all locations. The windier areas, where the wind microclimate is suitable for leisure walking, are at locations 3, 25, 26, 27, 28, 34, 35, 36, 38, 50 and 51 at ground level and location 58 on the terrace level. The greatest concentration of locations where the wind microclimate is classified as suitable for leisure walking occurs at the southern corner of the Centrepoint Tower.

Location 25 is the only entrance where the wind microclimate would be windier than desired during the windiest season. This entrance, on the east elevation of the Centrepoint Tower would benefit from localised mitigation.

Throughout the summer months, most locations are suitable for sitting because the winds are lighter in the summer (Figure 8 and Figure 10). There is a cluster of locations to the south of the Tower where the wind microclimate is suitable for standing and then isolated areas at the northwest corner of the Tower and on New Oxford Street.

When compared with the baseline:

- Locations 9, 25, 42, 51 and 60 are one category windier whereas
- Locations 7, 12, 14, 21, 24, 30, 48, 63 and 64 are one category calmer.

Occurrence of Strong Winds

For Configuration 2, annually the wind speed exceeds Beaufort Force 6, on occasion, at locations 3, 27, 28, 34 and 50 for up to 4.7 hours per year. There are no locations where the wind speed exceeds Beaufort Force 7 or 8 for more than 1.0 hour per year. These results are listed in Table 2.

5.2.2 Configuration 3: Proposed development and cumulative surrounding buildings

The wind tunnel model was modified to incorporate cumulative developments and in particular, the development immediately south of the Centrepoint Tower. The neighbouring Crossrail scheme was included as part of the existing (baseline) surrounds as it is currently under construction. The remaining schemes in the list of cumulative schemes are considered to be sufficiently removed from the site so as not to interact with the wind conditions within and around proposed buildings, particularly when the prevailing winds blow.

When tested with the cumulative developments in situ, the wind microclimate at all ground level locations, for the windiest season (typically winter), is summarised as follows:

- Thirteen locations are suitable for sitting,
- Thirty locations are suitable for standing and
- Twelve locations are suitable for leisure walking

For the sensor locations at terrace level there were:

- Five locations suitable for sitting,
- Four locations suitable for standing and
- One location suitable for leisure walking

These results were very similar to the results for Configuration 2. When compared with the baseline:

- Locations 9, 25, 42, 51 and 60 are one category windier whereas
- Locations 7, 12, 14, 21, 24, 30, 48, 63 and 64 are one category calmer.

Occurrence of Strong Winds

For Configuration 3, annually the wind speed exceeds Beaufort Force 6, on occasion, at locations 3, 28, 36, 37 and 50 for up to 4.2 hours per year. The wind speed at location 34 exceeds Beaufort Force 7 for up to 2 hours per year. These results are listed in Table 2. When these strong winds occur we would expect walking to be impeded at location 34.

6. Mitigation Measures

The assessment above, and summarised in Figures 3 to 14, assumed that no planting or landscaping was present around or within the site, which is a conservative (i.e. windier) scenario because it assumes no beneficial shelter. In general, planting and other landscape enhancements would increase shelter within the Proposed Development compared to the wind conditions described above, particularly when the trees and plants are established and in full leaf.

The comparisons of the baseline wind microclimate with the results for Configurations 2 and 3 show a similar wind environment after development with the windiest zone in the area to the south of the Centrepoint Tower for all configurations. The entrance, location 25, is suitable for leisure walking during the windiest season and localised mitigation, such as a suitable screen, in the vicinity of the entrance would shelter people leaving the building. The stronger winds that occur at location 34, between the two buildings which form part of the cumulative scheme to the south of the Centrepoint Tower, are considered to be related to the massing of the cumulative scheme. Landscaping the space between the Centrepoint Tower and the cumulative development would disrupt winds blowing through this space.

7. Concluding Remarks

In conclusion:

1. The meteorological data for the site indicate prevailing winds from the south westerly quadrant throughout the year, and secondary winds from the north easterly direction particularly during the springtime.
2. In the wind assessment no landscaping or planting has been considered around the Proposed Development, which is a conservative assumption particularly during the summer season when trees and plants are in leaf. The proposed landscaping is expected to create a calmer environment than reported in this assessment.
3. The wind microclimate during the windiest season, for the Baseline, is predominantly suitable for either sitting or standing within and around the site. However, there are leisure walking conditions in isolated areas but predominantly on the south side of the Centrepoint Tower. There are also some locations (Table 2) where the wind speed exceeds Beaufort Force 6 on occasion.
4. For the Proposed Development with existing surrounds, at ground level and on the terraces, the wind microclimate around the Proposed Development is suitable for sitting, standing/entrance use or leisure walking. These results are compatible with the intended pedestrian use of the site and are similar to the results for the Baseline which reflects the similarities in the massing as far as the wind is concerned. The locations where the wind speed exceeds Beaufort Force 6 are listed in Table 6. The entrance location 25, on the east elevation of the Centrepoint Tower, would benefit from the provision of localized screening to shelter people leaving the building.

5. When neighbouring cumulative developments are built, the wind microclimate within and around the Proposed Development remains similar to that for Configuration 2. However, it is noted that there are windier conditions and occasional strong winds, in excess of Beaufort force 7, in the gap between the two cumulative buildings south of the Centrepoint Tower. This are would benefit from suitable landscaping in order to disrupt the winds that blow through this part of the Site. However, it is likely that these windier conditions are related to the massing of the cumulative scheme.

Wind Direction>>	0	30	60	90	120	150	180	210	240	270	300	330
Mean Factor at 10m	0.58	0.59	0.59	0.60	0.58	0.58	0.61	0.58	0.58	0.57	0.58	0.59
Mean Factor at 120m	1.37	1.41	1.40	1.44	1.35	1.36	1.45	1.39	1.38	1.34	1.34	1.36

Table 1: BREVe3 mean factors at 10m and 120m above ground level

Location	Beaufort Force Exceedence	Direction	Hours per Annum
Configuration 1 – Baseline			
3	B6	240	3.6
27	B6	60	2.9
28	B6	60	2.1
34	B6	240	1.6
38	B6	260	1.1
50	B6	220	4.8
Configuration 2 – Proposed Development + Existing Surroundings			
3	B6	240	4.7
27	B6	40	2.2
28	B6	60	2.4
34	B6	240	1.6
50	B6	220	4.9
Configurations 2 & 3 – Proposed Development			
3	B6	240	4.0
28	B6	60	2.2
36	B6	280	1.7
37	B6	260	1.1
50	B6	220	4.2
34	B7	250	2.0

Table 2: Annual Exceedence of Strong Winds (& Most Frequent Wind Direction)

Figure 1: Aerial Photograph of the Existing Site (approx. Site highlighted in yellow)

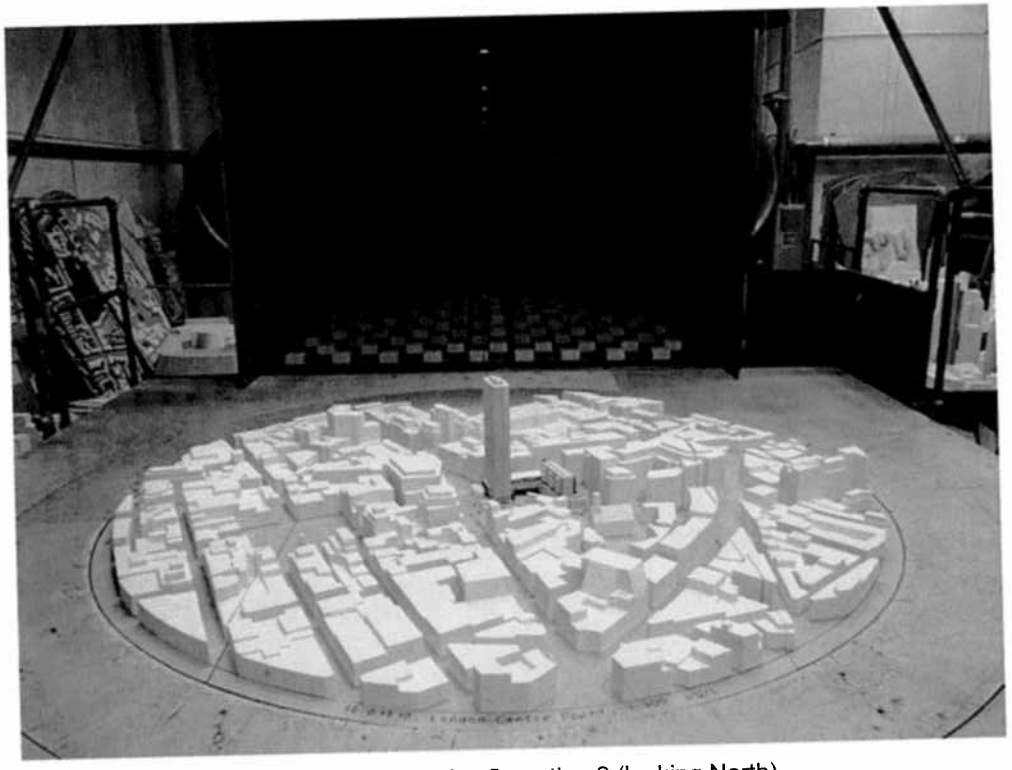

Figure 2: View of Configuration 2 (looking North)

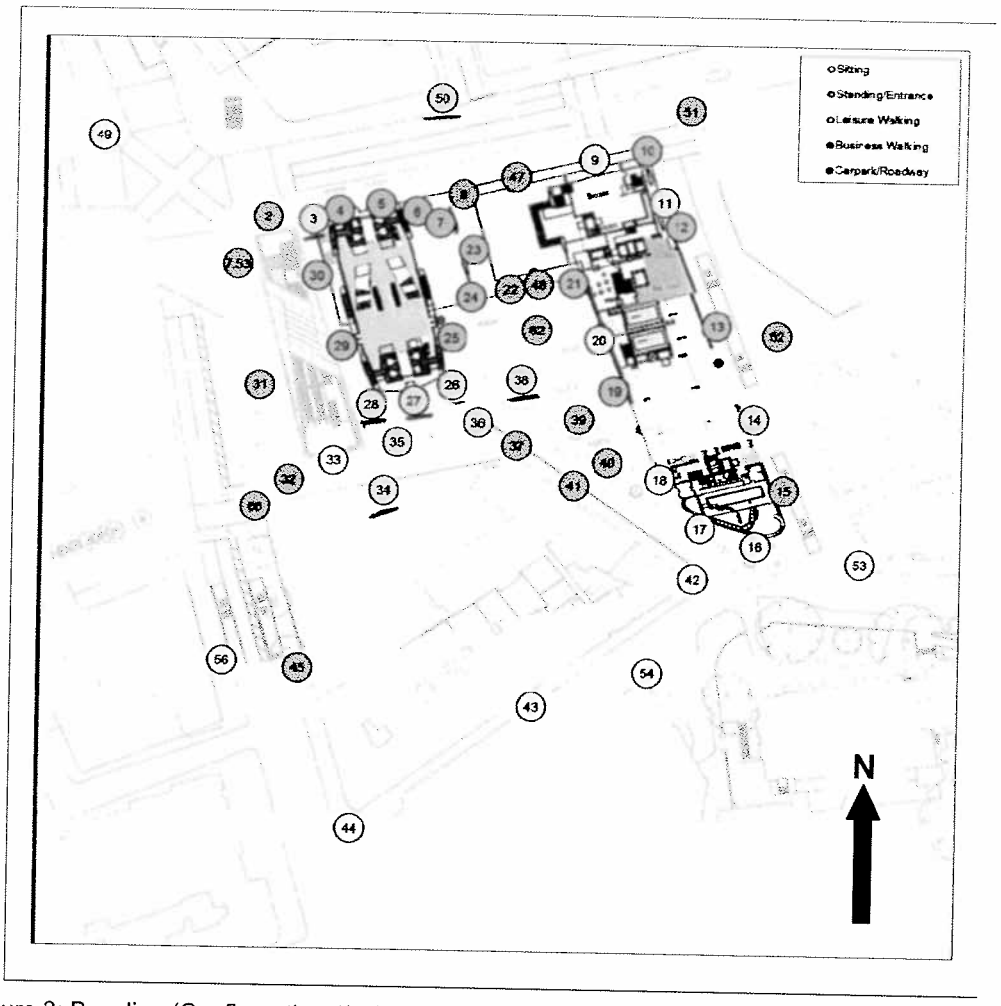

Figure 3: Baseline (Configuration 1): Ground Level – Lawson Comfort Criteria (Windiest Season)

Yellow = windie
Underlined = Boundary Exceeded

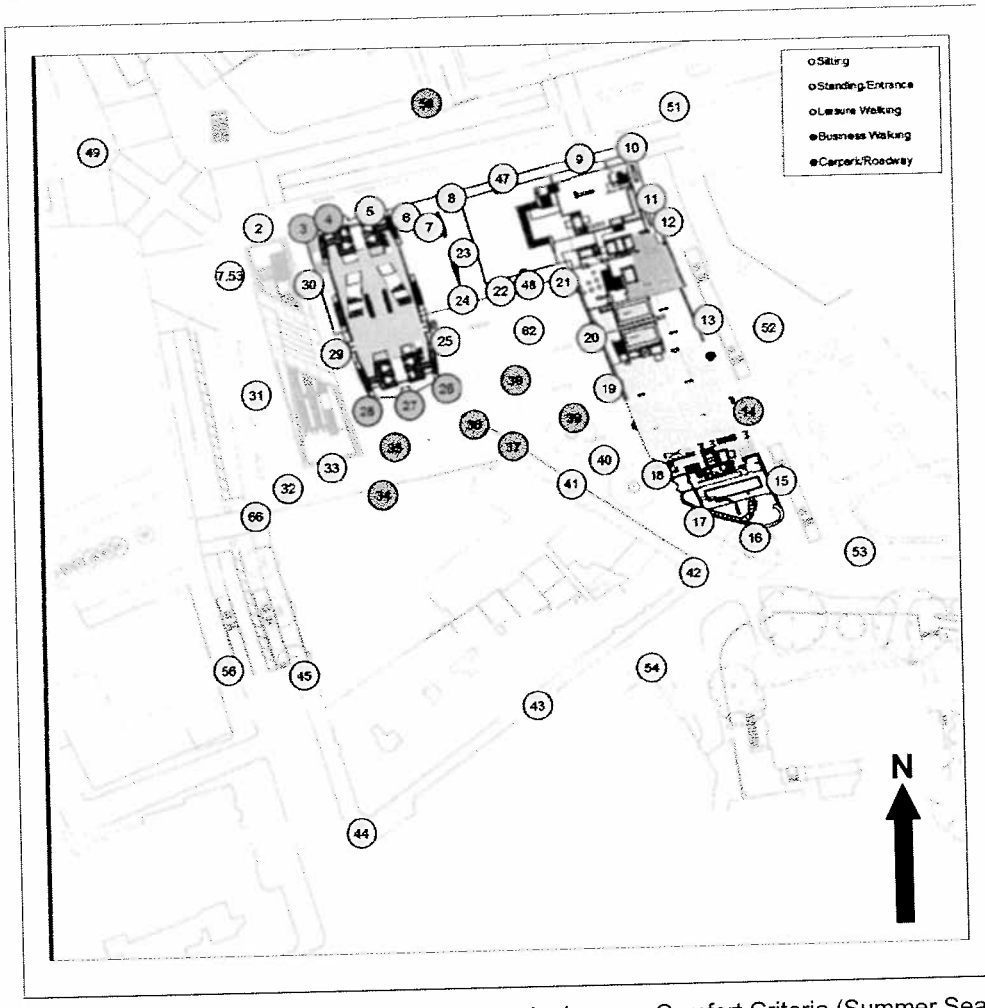

Figure 4: Baseline (Configuration 1): Ground Level – Lawson Comfort Criteria (Summer Season)

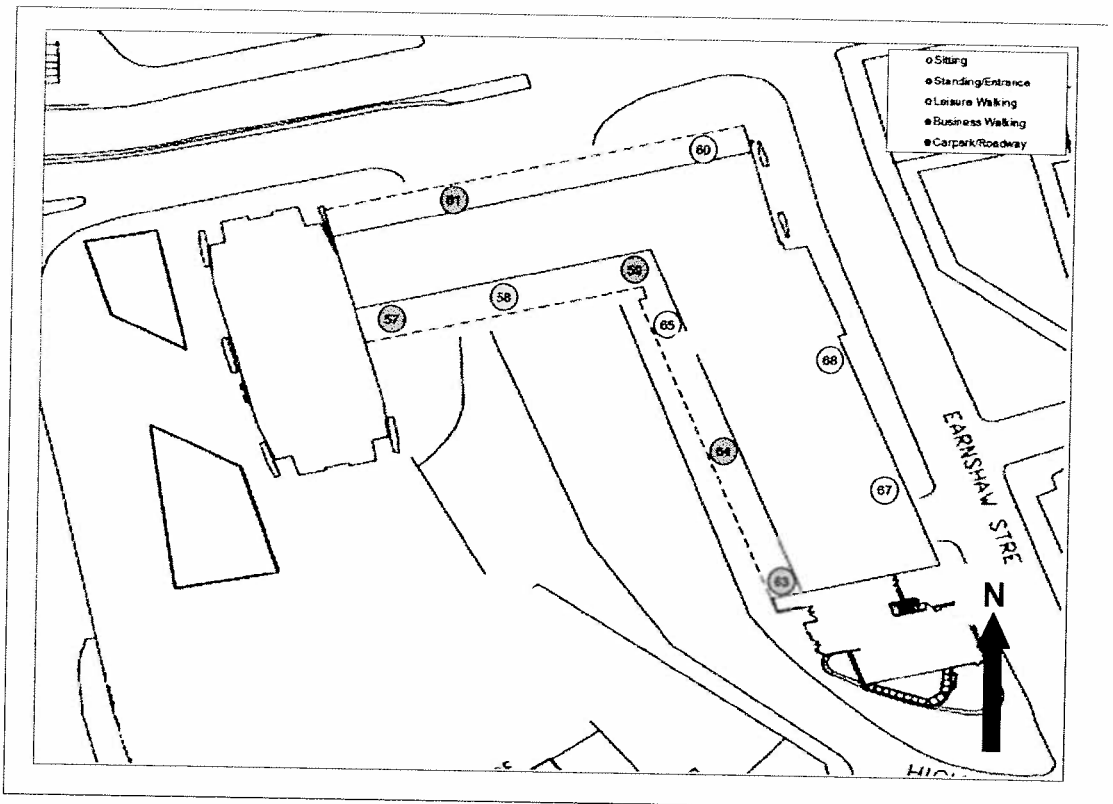

Figure 5: Baseline (Configuration 1b): Upper Levels – Lawson Comfort Criteria (Windiest Season)

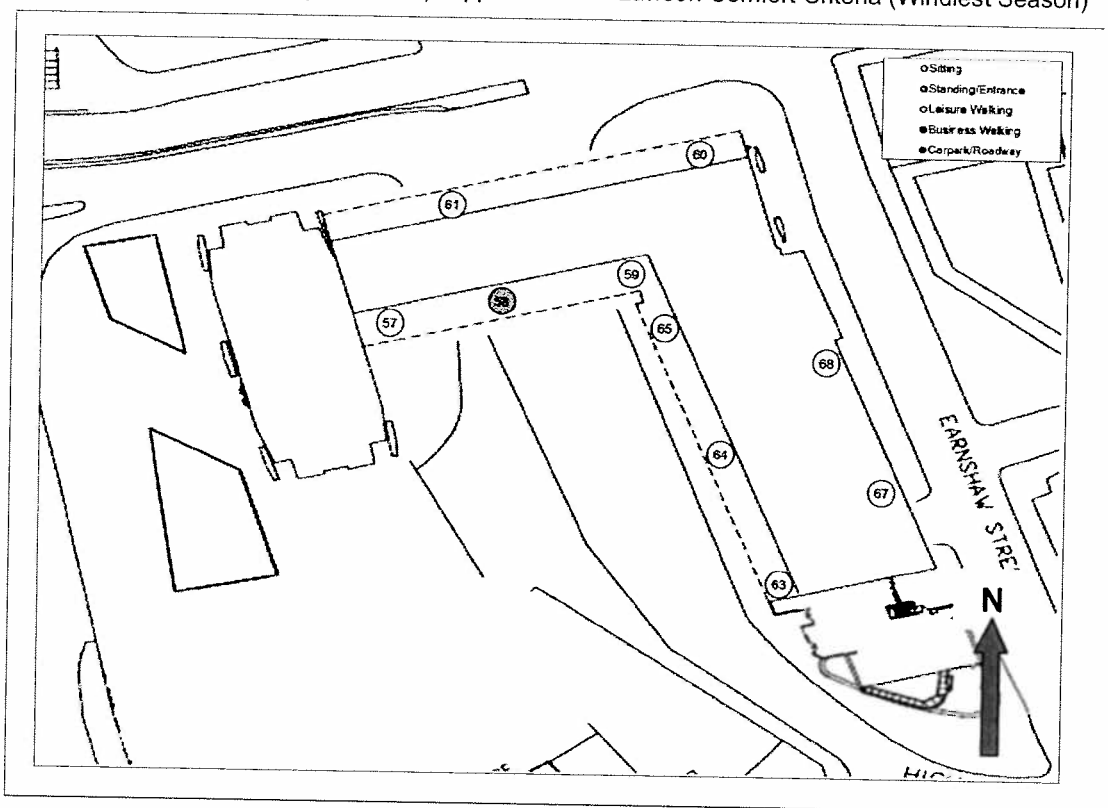

Figure 6: Baseline (Configuration 1):Upper Levels – Lawson Comfort Criteria (Summer Season)

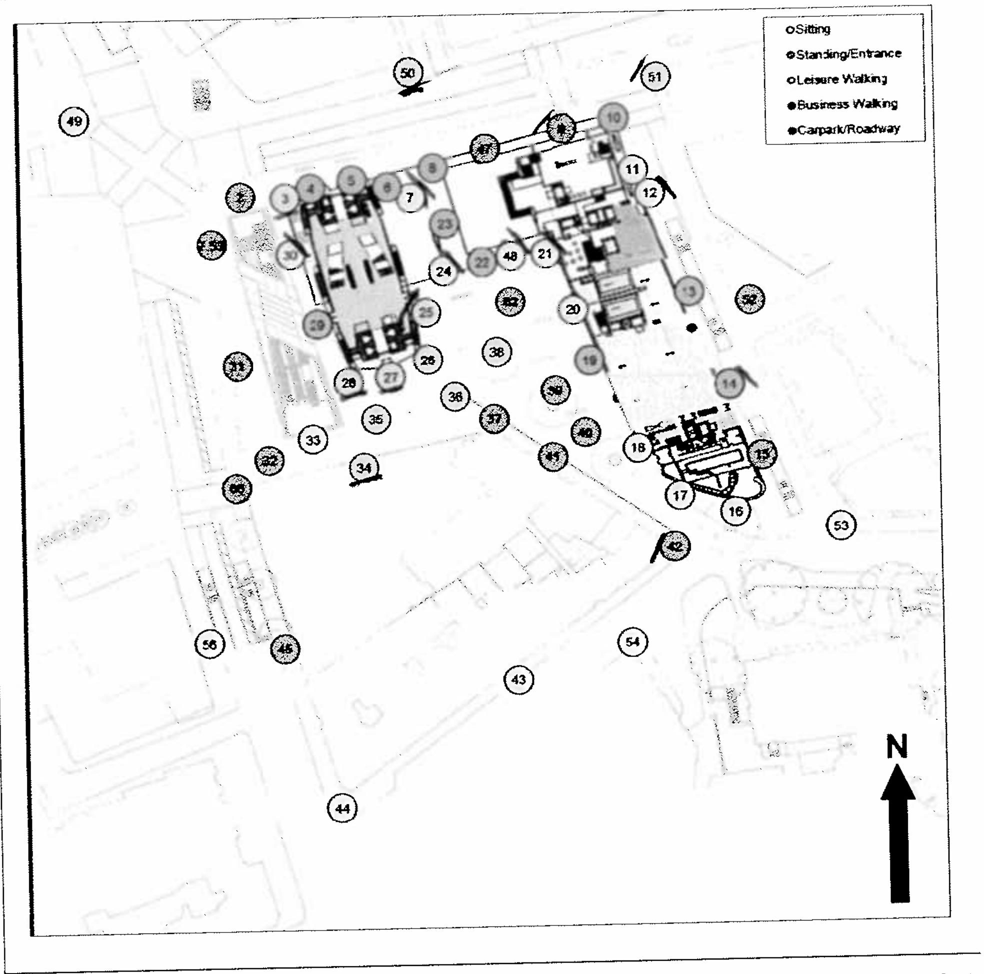

Figure 7: Proposed Development (Configuration 2): Ground Level – Lawson Comfort Criteria (Windiest Season)

= windier
= calmer
– Beaufort 6

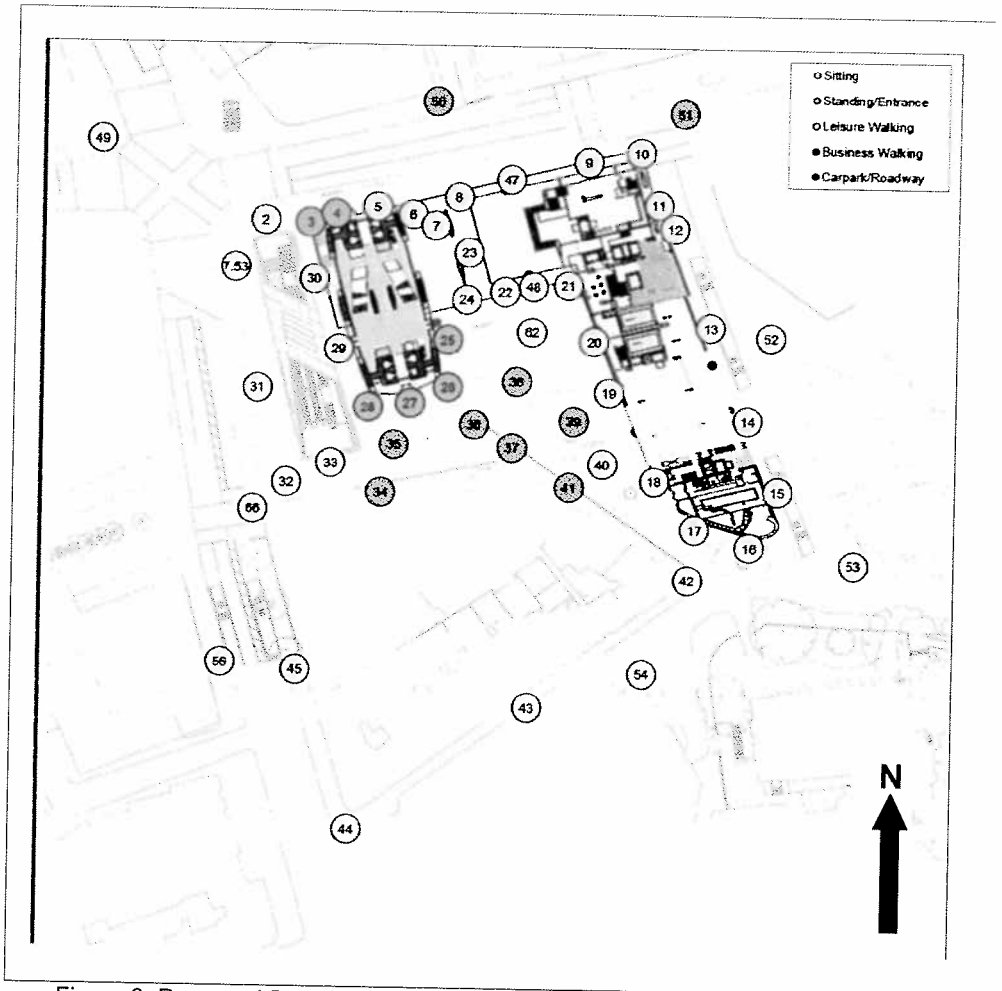

Figure 8: Proposed Development (Configuration 2): Ground Level – Lawson Comfort Criteria (Summer Season)

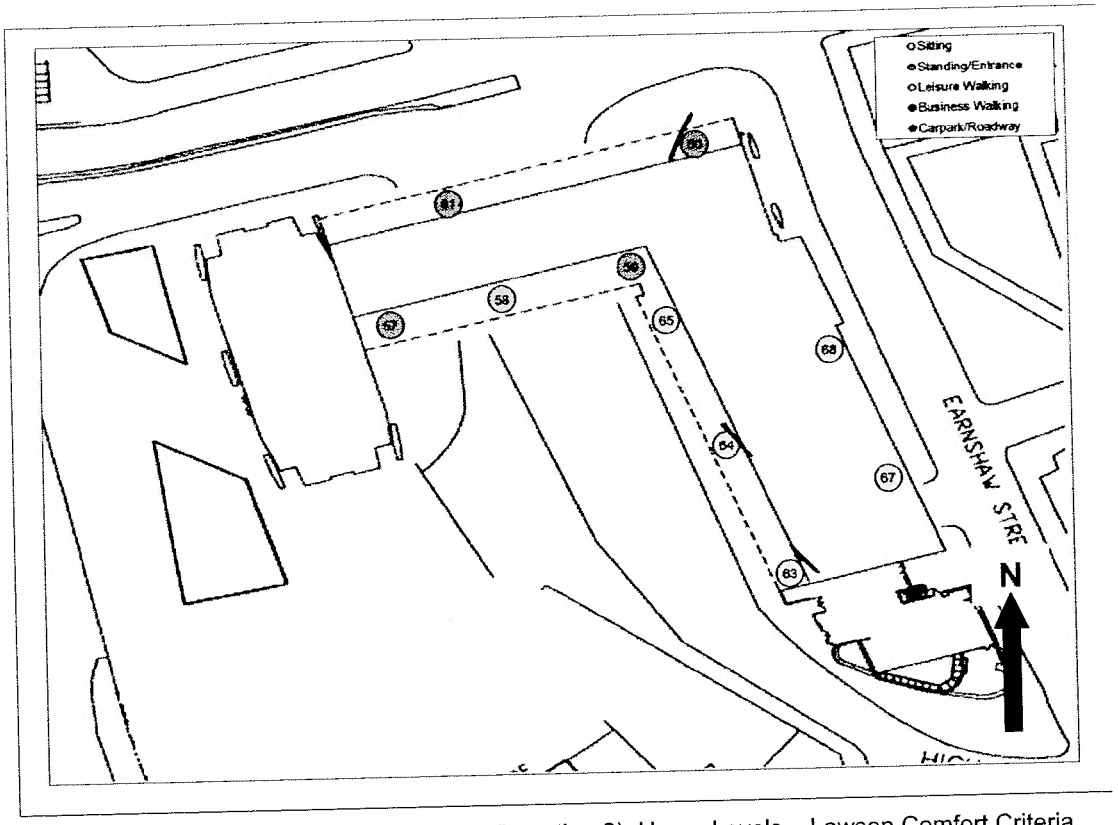

Figure 9: Proposed Development (Configuration 2): Upper Levels – Lawson Comfort Criteria (Windiest Season)

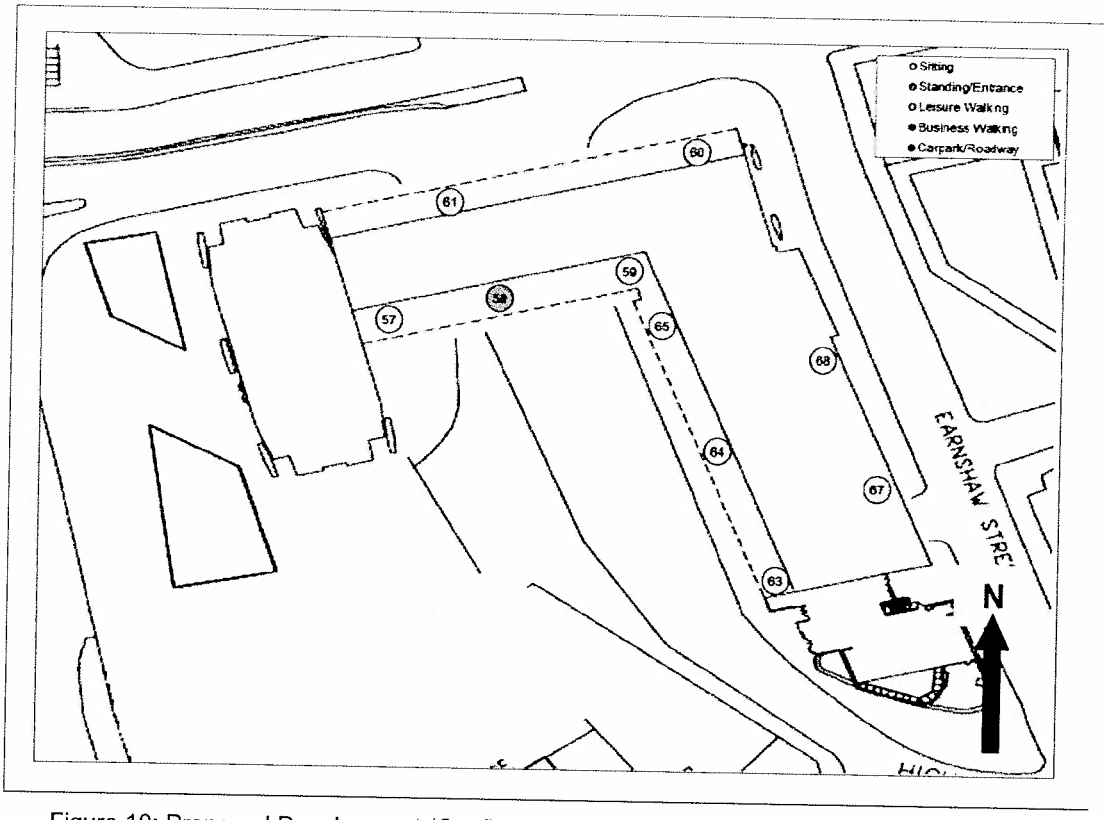

Figure 10: Proposed Development (Configuration 2): Upper Levels – Lawson Comfort Criteria (Summer Season)

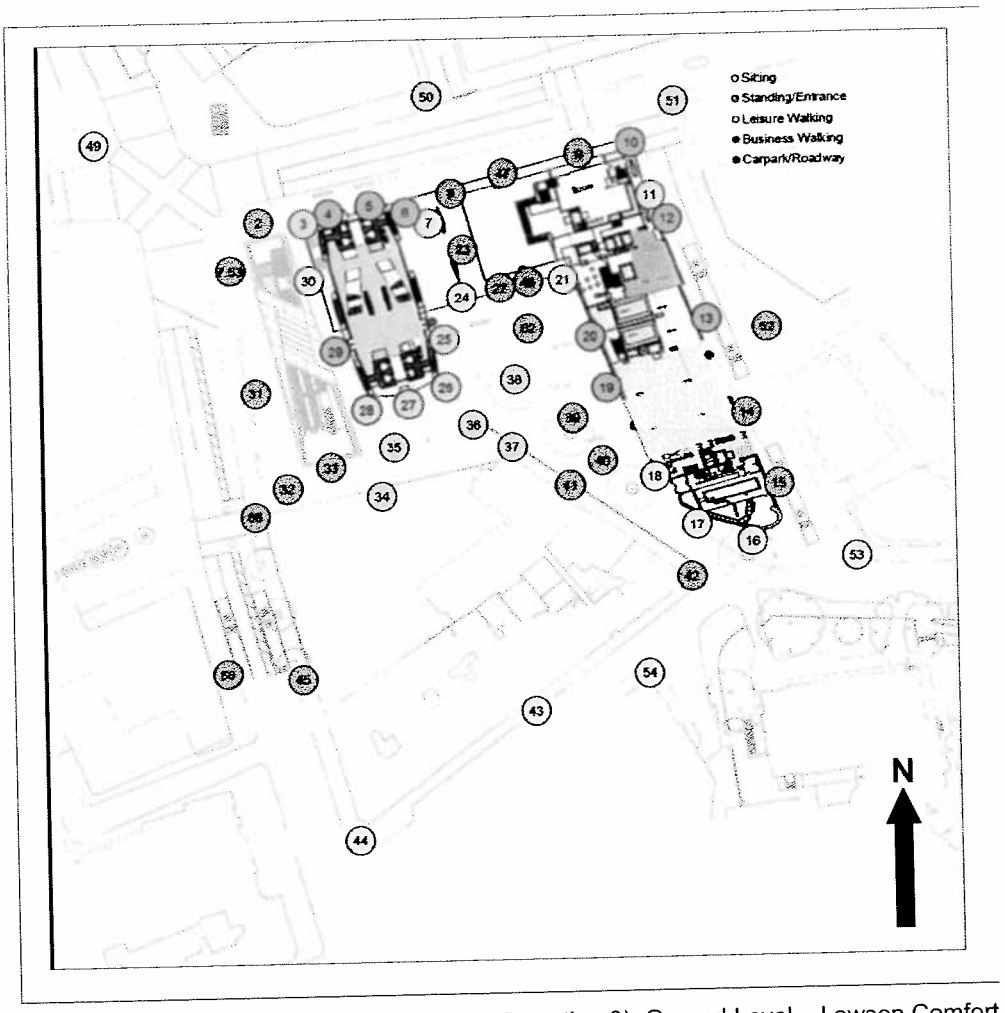

Figure 11: Proposed Development (Configuration 3): Ground Level – Lawson Comfort Criteria (Windiest Season)

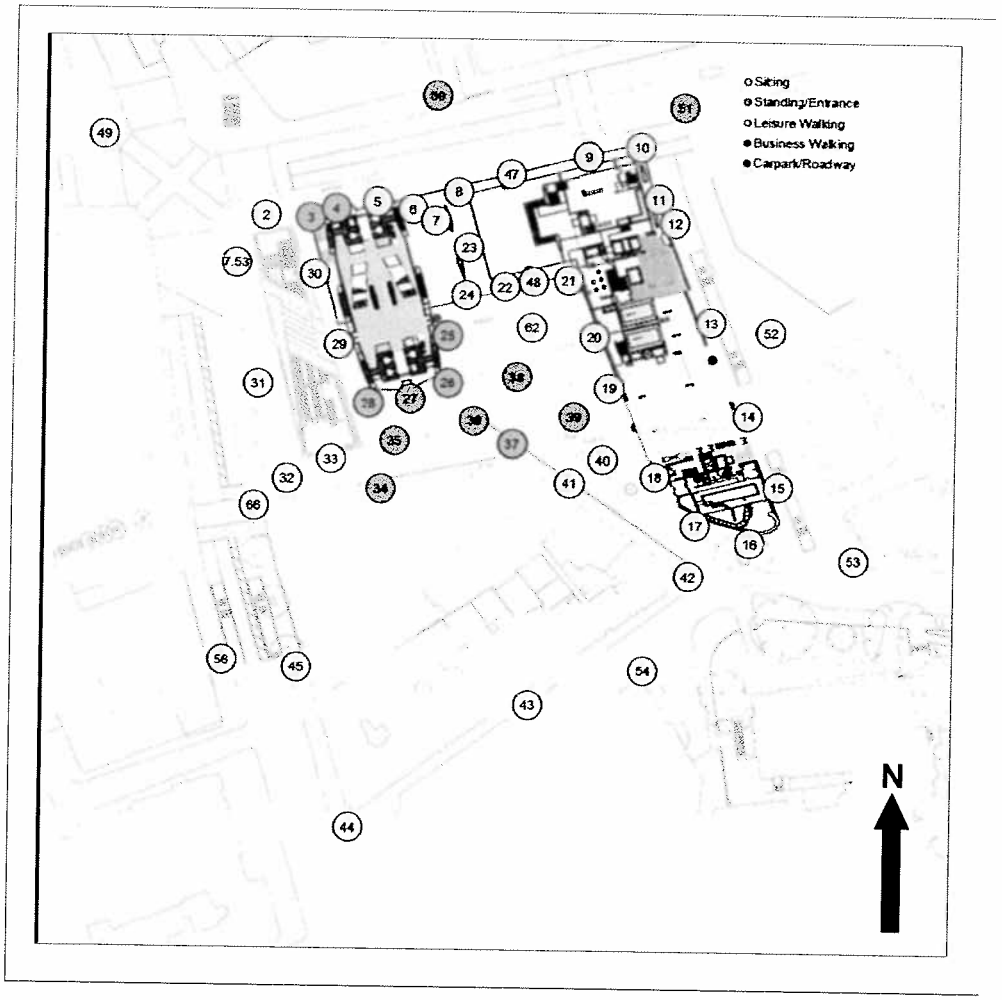

Figure 12: Proposed Development (Configuration 3): Ground Level – Lawson Comfort Criteria (Summer Season)

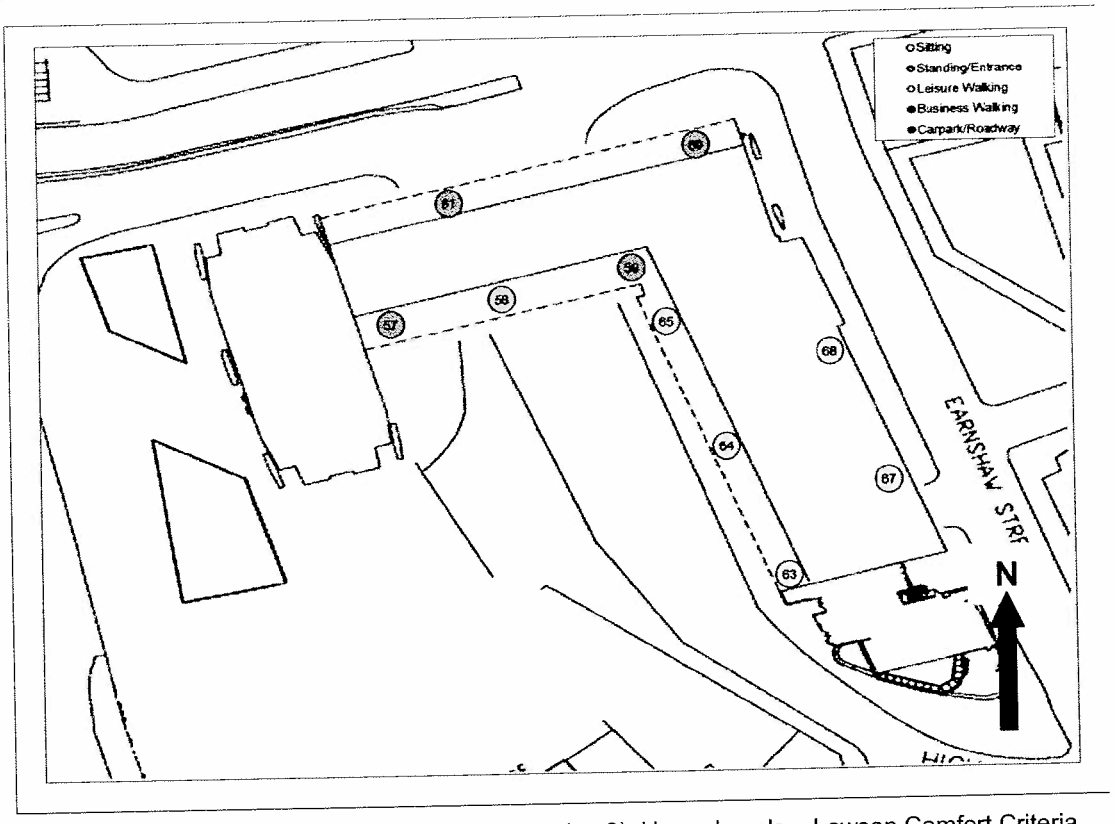

Figure 13: Proposed Development (Configuration 3): Upper Levels – Lawson Comfort Criteria (Windiest Season)

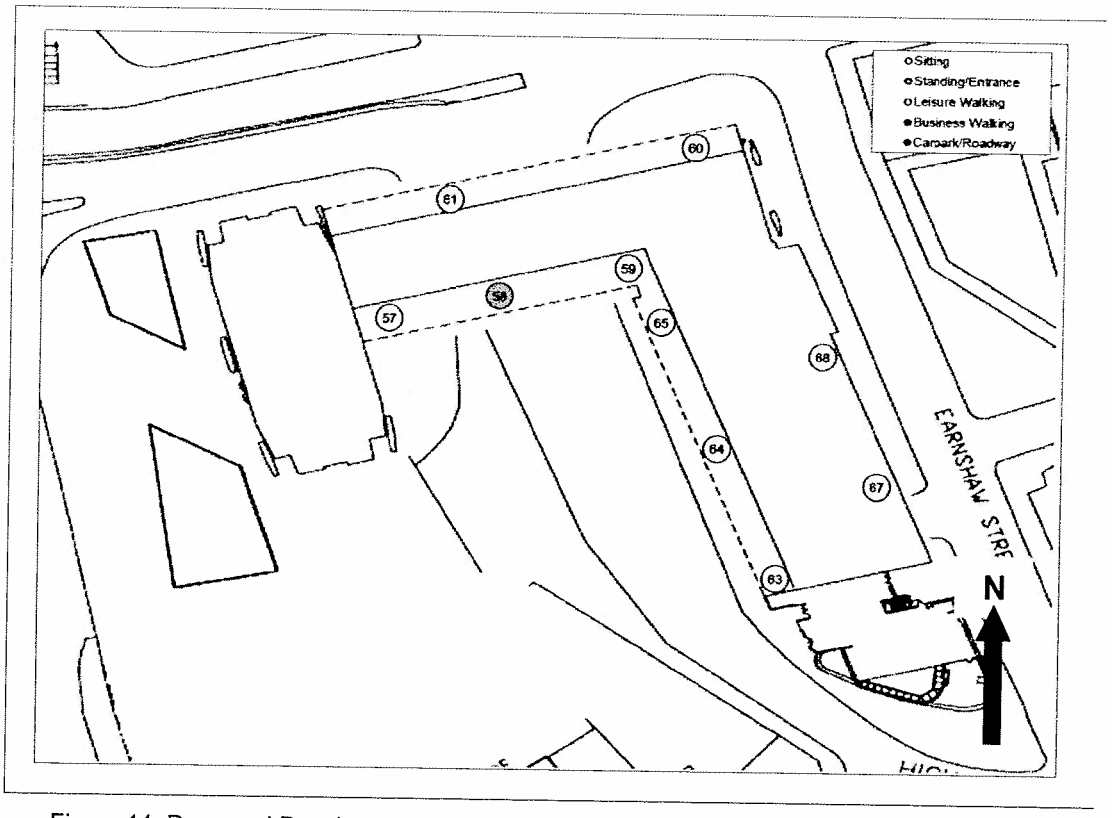

Figure 14: Proposed Development (Configuration 3): Upper Levels – Lawson Comfort Criteria (Summer Season)

Appendix A: Photographs of the Wind Tunnel Model

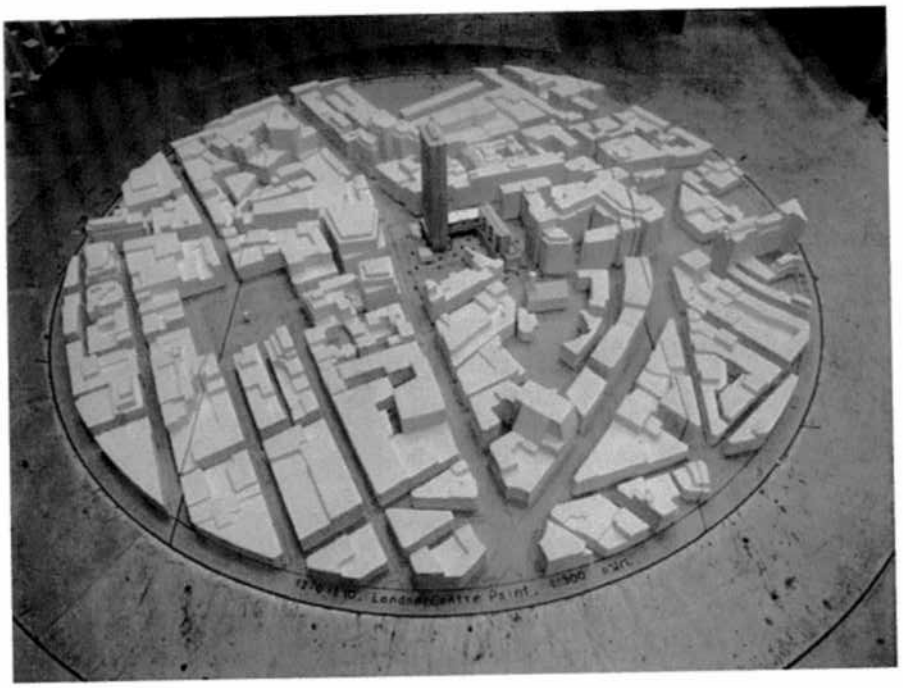

Figure 15: Primary Baseline (Configuration 1a) – View in the Wind Tunnel (top view – west up)

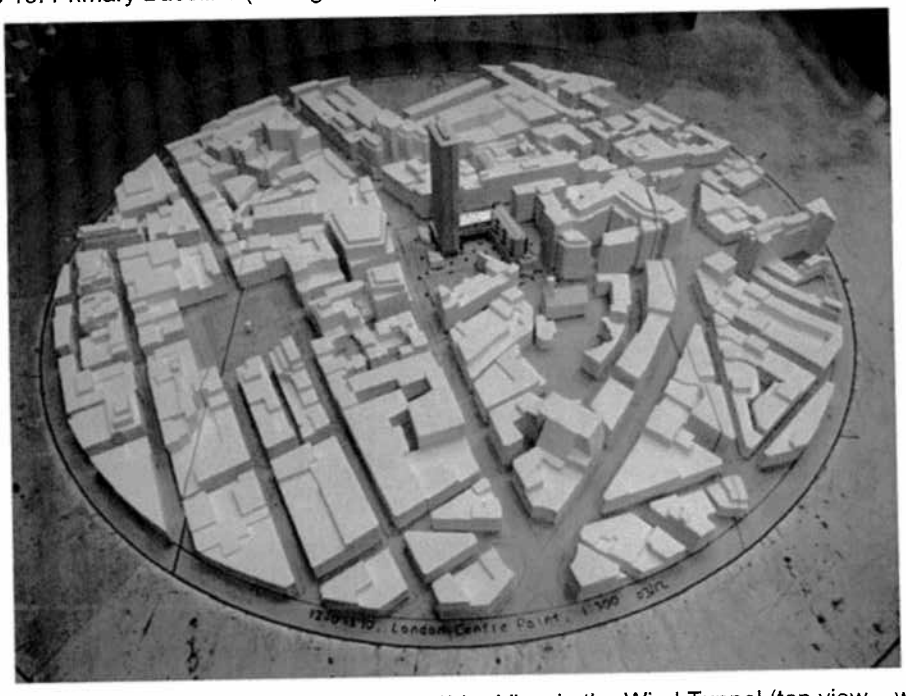

Figure 16: Secondary Baseline (Configuration 1b) – View in the Wind Tunnel (top view – west up)

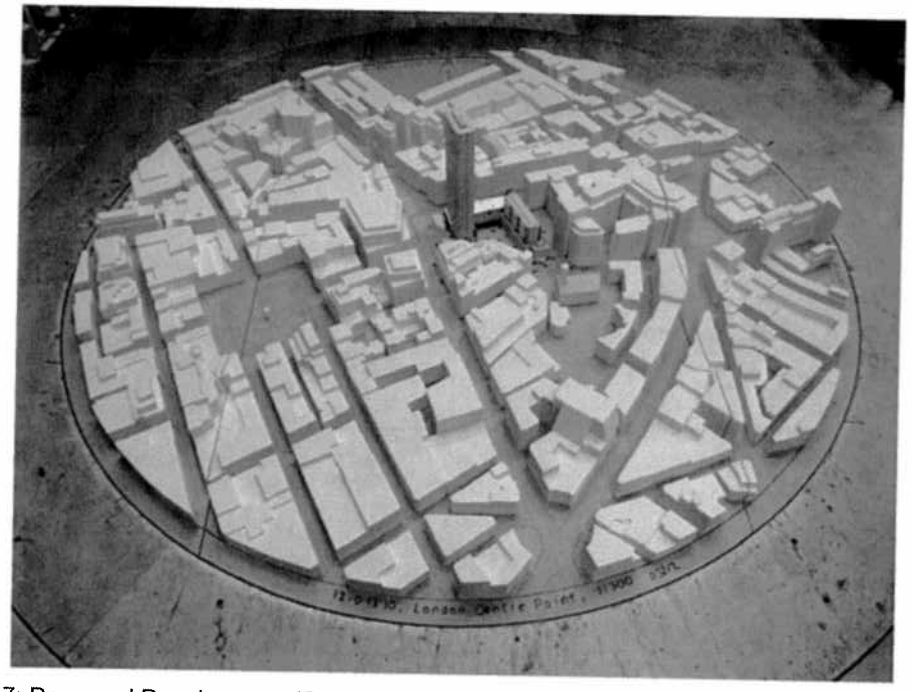

Figure 17: Proposed Development (Configuration 3) – View in the Wind Tunnel (top view – west up)

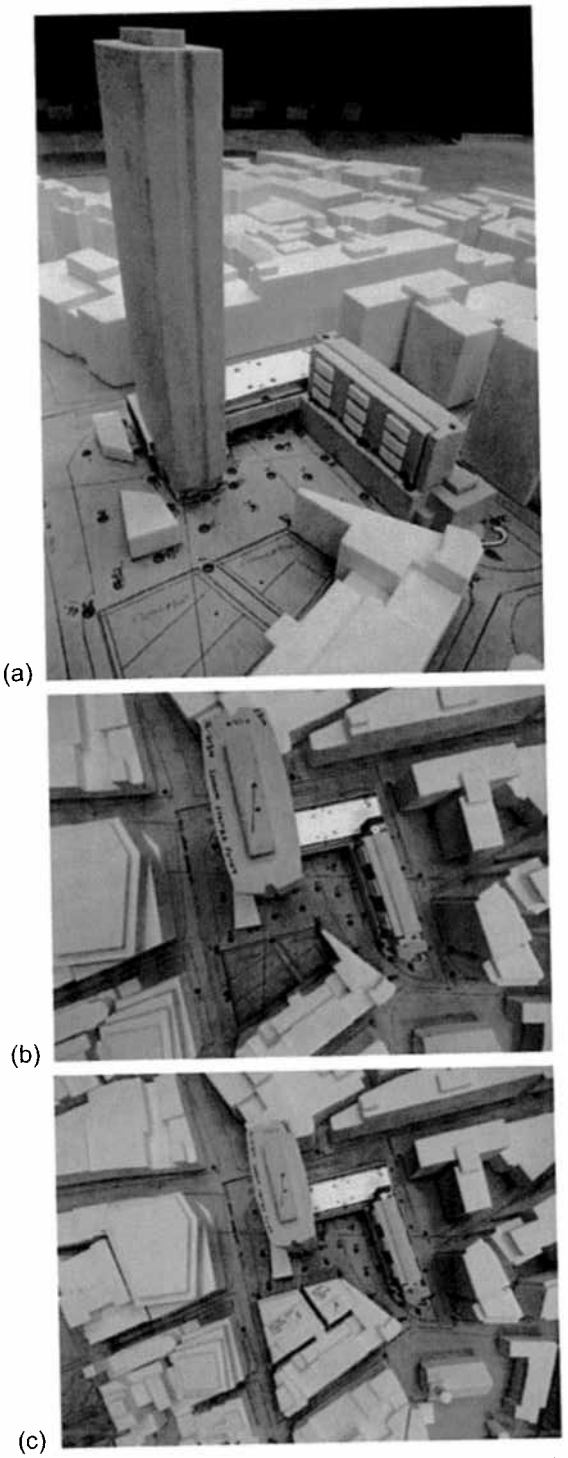

Figure 18: Close-up showing (a) Configuration 1, (b) Configuration 2 and (c) Configuration 3

Appendix B: Meteorological Data

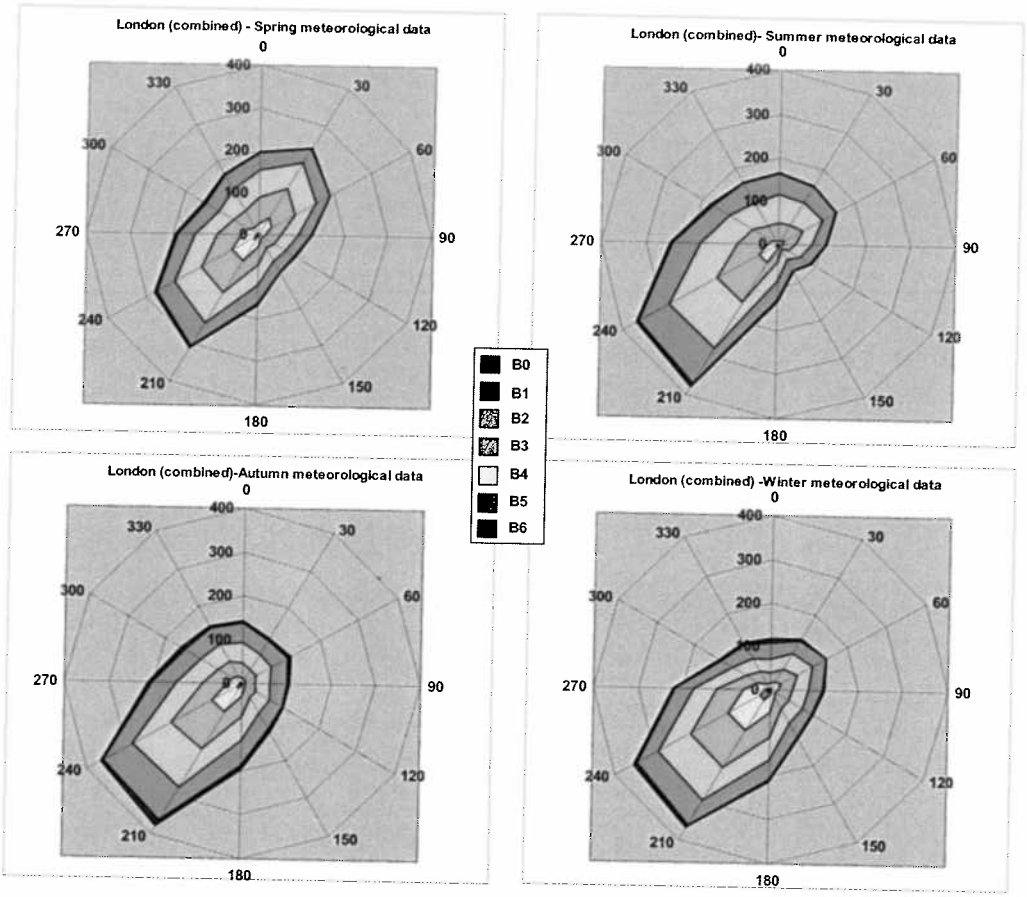

Figure 19: Seasonal wind roses for London, United Kingdom (in Beaufort Force)
(Hours that wind speed is greater than the stated Beaufort Force)

Appendix C: Lawson Comfort Criteria

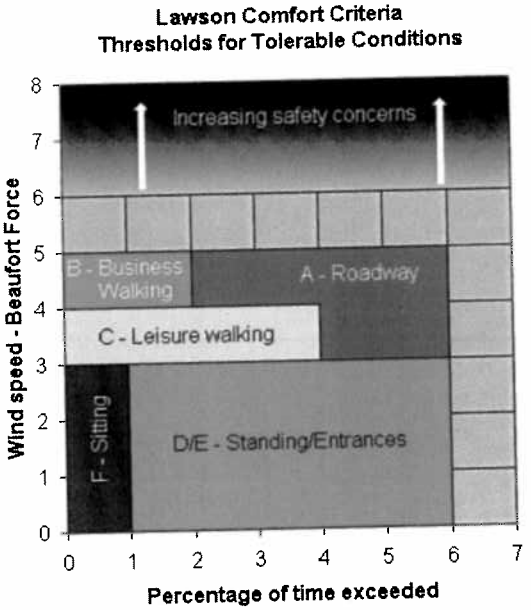

Figure 20: Graphical representation of the Lawson Comfort Criteria

DESCRIPTION	LETTER	THRESHOLD
Roads and Car Parks	A	6% > B5
Business Walking	B	2% > B5
Pedestrian Walk-through	C	4% > B4
Pedestrian Standing	D	6% > B3
Entrance Doors	E	6% > B3
Sitting	F	1% > B3

Table 3: Lawson Comfort Criteria

BEAUFORT FORCE	HOURLY-AVERAGE WIND SPEED (m/s)	DESCRIPTION OF WIND	NOTICEABLE WIND EFFECT
0	< 0.45	Calm	Smoke rises vertically
1	0.45 – 1.55	Light Air	Direction shown by smoke drift but not by vanes
2	1.55 – 3.35	Light Breeze	Wind felt on face; leaves rustle; wind vane moves
3	3.35 – 5.60	Gentle Breeze	Leaves & twigs in motion; wind extends a flag
4	5.60 – 8.25	Moderate Breeze	Raises dust and loose paper; small branches move
5	8.25 – 10.95	Fresh Breeze	Small trees, in leaf, sway
6	10.95 - 14.10	Strong Breeze	Large branches begin to move; telephone wires whistle
7	14.10 - 17.20	Near Gale	Whole trees in motion
8	17.20 - 20.80	Gale	Twigs break off; personal progress impeded
9	20.80 - 24.35	Strong Gale	Slight structural damage; chimney pots removed
10	24.35 - 28.40	Storm	Trees uprooted; considerable structural damage
11	28.40 - 32.40	Violent Storm	Damage is widespread; unusual in the U.K.
12	> 32.40	Hurricane	Countryside is devastated; only occurs in tropical countries

Table 4: The Beaufort Land Scale

Appendix D: Comfort Criteria Results

Results are presented for the existing and developed site for both mean wind speeds and gust wind speeds. In each table the first column contains the location numbers. The remaining columns are the pedestrian activity for which the measured wind conditions were tolerable.

Location	All	Spring	Summer	Autumn	Winter
1	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
2	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
3	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
4	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
5	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
6	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
7	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
8	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
9	Sitting	Sitting	Sitting	Sitting	Sitting
10	Sitting	Sitting	Sitting	Sitting	Sitting
11	Sitting	Sitting	Sitting	Sitting	Sitting
12	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
13	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
14	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
15	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
16	Sitting	Sitting	Sitting	Sitting	Sitting
17	Sitting	Sitting	Sitting	Sitting	Sitting
18	Sitting	Sitting	Sitting	Sitting	Sitting
19	Sitting	Sitting	Sitting	Sitting	Sitting
20	Sitting	Sitting	Sitting	Sitting	Sitting
21	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
22	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
23	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
24	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
25	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
26	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
27	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
28	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
29	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
30	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
31	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
32	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
33	Sitting	Sitting	Sitting	Sitting	Sitting
34	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
35	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
36	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
37	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
38	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
39	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
40	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
41	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
42	Sitting	Sitting	Sitting	Sitting	Sitting
43	Sitting	Sitting	Sitting	Sitting	Sitting

44	Sitting	Sitting	Sitting	Sitting	Sitting
45	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
46	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
47	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
48	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
49	Sitting	Sitting	Sitting	Sitting	Sitting
50	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
51	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
52	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
53	Sitting	Sitting	Sitting	Sitting	Sitting
54	Sitting	Sitting	Sitting	Sitting	Sitting
55	Sitting	Sitting	Sitting	Sitting	Sitting
56	Sitting	Sitting	Sitting	Sitting	Sitting
57	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
58	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
59	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
60	Sitting	Sitting	Sitting	Sitting	Sitting
61	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
62	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
63	Standing/Entrance	Sitting	Sitting	Standing/Entrance	Standing/Entrance
64	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
65	Sitting	Sitting	Sitting	Sitting	Sitting
66	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
67	Sitting	Sitting	Sitting	Sitting	Sitting
68	Sitting	Sitting	Sitting	Sitting	Sitting

Table 5: Comfort Criteria Derived From Mean Wind Speeds – *Baseline*

Location	All	Spring	Summer	Autumn	Winter
1	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
2	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
3	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
4	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
5	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
6	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
7	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
8	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
9	Sitting	Sitting	Sitting	Sitting	Sitting
10	Sitting	Sitting	Sitting	Sitting	Sitting
11	Sitting	Sitting	Sitting	Sitting	Sitting
12	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
13	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
14	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
15	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
16	Sitting	Sitting	Sitting	Sitting	Sitting
17	Sitting	Sitting	Sitting	Sitting	Sitting
18	Sitting	Sitting	Sitting	Sitting	Sitting
19	Sitting	Sitting	Sitting	Sitting	Sitting
20	Sitting	Sitting	Sitting	Sitting	Sitting
21	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
22	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
23	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
24	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
25	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
26	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
27	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
28	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
29	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
30	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
31	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
32	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
33	Sitting	Sitting	Sitting	Sitting	Sitting
34	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
35	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
36	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
37	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
38	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
39	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
40	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
41	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
42	Sitting	Sitting	Sitting	Sitting	Sitting
43	Sitting	Sitting	Sitting	Sitting	Sitting
44	Sitting	Sitting	Sitting	Sitting	Sitting
45	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
46	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
47	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
48	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance

49	Sitting	Sitting	Sitting	Sitting	Sitting
50	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
51	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
52	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
53	Sitting	Sitting	Sitting	Sitting	Sitting
54	Sitting	Sitting	Sitting	Sitting	Sitting
55	Sitting	Sitting	Sitting	Sitting	Sitting
56	Sitting	Sitting	Sitting	Sitting	Sitting
57	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
58	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
59	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
60	Sitting	Sitting	Sitting	Sitting	Sitting
61	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
62	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
63	Standing/Entrance	Sitting	Sitting	Standing/Entrance	Standing/Entrance
64	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
65	Sitting	Sitting	Sitting	Sitting	Sitting
66	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
67	Sitting	Sitting	Sitting	Sitting	Sitting
68	Sitting	Sitting	Sitting	Sitting	Sitting

Table 6: Comfort Criteria Derived From Gust Wind Speeds – *Baseline*

Location	All	Spring	Summer	Autumn	Winter
1	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
2	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
3	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
4	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
5	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
6	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
7	Sitting	Sitting	Sitting	Sitting	Sitting
8	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
9	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
10	Sitting	Sitting	Sitting	Sitting	Sitting
11	Sitting	Sitting	Sitting	Sitting	Sitting
12	Sitting	Sitting	Sitting	Sitting	Sitting
13	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
14	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
15	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
16	Sitting	Sitting	Sitting	Sitting	Sitting
17	Sitting	Sitting	Sitting	Sitting	Sitting
18	Sitting	Sitting	Sitting	Sitting	Sitting
19	Sitting	Sitting	Sitting	Sitting	Sitting
20	Sitting	Sitting	Sitting	Sitting	Sitting
21	Sitting	Sitting	Sitting	Sitting	Sitting
22	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
23	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
24	Sitting	Sitting	Sitting	Sitting	Sitting
25	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
26	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
27	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Standing/Entrance
28	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
29	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
30	Sitting	Sitting	Sitting	Sitting	Sitting
31	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
32	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
33	Sitting	Sitting	Sitting	Sitting	Sitting
34	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
35	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
36	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
37	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
38	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
39	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
40	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
41	Standing/Entrance	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance
42	Sitting	Standing/Entrance	Sitting	Sitting	Sitting
43	Sitting	Sitting	Sitting	Sitting	Sitting
44	Sitting	Sitting	Sitting	Sitting	Sitting
45	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
46	Sitting	Sitting	Sitting	Sitting	Sitting
47	Sitting	Sitting	Sitting	Sitting	Sitting
48	Sitting	Sitting	Sitting	Sitting	Sitting

49	Sitting	Sitting	Sitting	Sitting	Sitting
50	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
51	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
52	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
53	Sitting	Sitting	Sitting	Sitting	Sitting
54	Sitting	Sitting	Sitting	Sitting	Sitting
55	Sitting	Sitting	Sitting	Sitting	Sitting
56	Sitting	Sitting	Sitting	Sitting	Sitting
57	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
58	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
59	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
60	Sitting	Sitting	Sitting	Sitting	Sitting
61	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
62	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
63	Sitting	Sitting	Sitting	Sitting	Sitting
64	Sitting	Sitting	Sitting	Sitting	Sitting
65	Sitting	Sitting	Sitting	Sitting	Sitting
66	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
67	Sitting	Sitting	Sitting	Sitting	Sitting
68	Sitting	Sitting	Sitting	Sitting	Sitting

Table 7: Comfort Criteria Derived From Mean Wind Speeds – Configuration 2

Location	All	Spring	Summer	Autumn	Winter
1	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
2	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
3	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
4	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
5	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
6	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
7	Sitting	Sitting	Sitting	Sitting	Sitting
8	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
9	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
10	Sitting	Sitting	Sitting	Sitting	Sitting
11	Sitting	Sitting	Sitting	Sitting	Sitting
12	Sitting	Sitting	Sitting	Sitting	Sitting
13	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
14	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
15	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
16	Sitting	Sitting	Sitting	Sitting	Sitting
17	Sitting	Sitting	Sitting	Sitting	Sitting
18	Sitting	Sitting	Sitting	Sitting	Sitting
19	Sitting	Sitting	Sitting	Sitting	Sitting
20	Sitting	Sitting	Sitting	Sitting	Sitting
21	Sitting	Sitting	Sitting	Sitting	Sitting
22	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
23	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
24	Sitting	Sitting	Sitting	Sitting	Sitting
25	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
26	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
27	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Standing/Entrance
28	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
29	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
30	Sitting	Sitting	Sitting	Sitting	Sitting
31	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
32	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
33	Sitting	Sitting	Sitting	Sitting	Sitting
34	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
35	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
36	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
37	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
38	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
39	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
40	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
41	Standing/Entrance	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance
42	Sitting	Standing/Entrance	Sitting	Sitting	Sitting
43	Sitting	Sitting	Sitting	Sitting	Sitting
44	Sitting	Sitting	Sitting	Sitting	Sitting
45	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
46	Sitting	Sitting	Sitting	Sitting	Sitting
47	Sitting	Sitting	Sitting	Sitting	Sitting
48	Sitting	Sitting	Sitting	Sitting	Sitting

49	Sitting	Sitting	Sitting	Sitting	Sitting
50	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
51	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
52	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
53	Sitting	Sitting	Sitting	Sitting	Sitting
54	Sitting	Sitting	Sitting	Sitting	Sitting
55	Sitting	Sitting	Sitting	Sitting	Sitting
56	Sitting	Sitting	Sitting	Sitting	Sitting
57	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
58	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
59	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
60	Sitting	Sitting	Sitting	Sitting	Sitting
61	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
62	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
63	Sitting	Sitting	Sitting	Sitting	Sitting
64	Sitting	Sitting	Sitting	Sitting	Sitting
65	Sitting	Sitting	Sitting	Sitting	Sitting
66	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
67	Sitting	Sitting	Sitting	Sitting	Sitting
68	Sitting	Sitting	Sitting	Sitting	Sitting

Table 8: Comfort Criteria Derived From Gust Wind Speeds – Configuration 2

Location	All	Spring	Summer	Autumn	Winter
1	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
2	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
3	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
4	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
5	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
6	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
7	Sitting	Sitting	Sitting	Sitting	Sitting
8	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
9	Sitting	Sitting	Sitting	Sitting	Sitting
10	Sitting	Sitting	Sitting	Sitting	Sitting
11	Sitting	Sitting	Sitting	Sitting	Sitting
12	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
13	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
14	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
15	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
16	Sitting	Sitting	Sitting	Sitting	Sitting
17	Sitting	Sitting	Sitting	Sitting	Sitting
18	Sitting	Sitting	Sitting	Sitting	Sitting
19	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
20	Sitting	Sitting	Sitting	Sitting	Sitting
21	Sitting	Sitting	Sitting	Sitting	Sitting
22	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
23	Sitting	Sitting	Sitting	Sitting	Sitting
24	Sitting	Sitting	Sitting	Sitting	Sitting
25	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
26	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
27	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
28	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
29	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
30	Sitting	Sitting	Sitting	Sitting	Sitting
31	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
32	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
33	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
34	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
35	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
36	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
37	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
38	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
39	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
40	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
41	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
42	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
43	Sitting	Sitting	Sitting	Sitting	Sitting
44	Sitting	Sitting	Sitting	Sitting	Sitting
45	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
46	Sitting	Sitting	Sitting	Sitting	Sitting
47	Sitting	Sitting	Sitting	Sitting	Sitting
48	Sitting	Sitting	Sitting	Sitting	Standing/Entrance

49	Sitting	Sitting	Sitting	Sitting	Sitting
50	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
51	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
52	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
53	Sitting	Sitting	Sitting	Sitting	Sitting
54	Sitting	Sitting	Sitting	Sitting	Sitting
55	Sitting	Sitting	Sitting	Sitting	Sitting
56	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
57	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
58	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
59	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
60	Sitting	Sitting	Sitting	Sitting	Sitting
61	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
62	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
63	Sitting	Sitting	Sitting	Sitting	Sitting
64	Sitting	Sitting	Sitting	Sitting	Sitting
65	Sitting	Sitting	Sitting	Sitting	Sitting
66	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
67	Sitting	Sitting	Sitting	Sitting	Sitting
68	Sitting	Sitting	Sitting	Sitting	Sitting

Table 9: Comfort Criteria Derived From Mean Wind Speeds – Configuration 3

Location	All	Spring	Summer	Autumn	Winter
1	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
2	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
3	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
4	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
5	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
6	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
7	Sitting	Sitting	Sitting	Sitting	Sitting
8	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
9	Sitting	Sitting	Sitting	Sitting	Sitting
10	Sitting	Sitting	Sitting	Sitting	Sitting
11	Sitting	Sitting	Sitting	Sitting	Sitting
12	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
13	Standing/Entrance	Sitting	Sitting	Sitting	Standing/Entrance
14	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
15	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
16	Sitting	Sitting	Sitting	Sitting	Sitting
17	Sitting	Sitting	Sitting	Sitting	Sitting
18	Sitting	Sitting	Sitting	Sitting	Sitting
19	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
20	Sitting	Sitting	Sitting	Sitting	Sitting
21	Sitting	Sitting	Sitting	Sitting	Sitting
22	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
23	Sitting	Sitting	Sitting	Sitting	Sitting
24	Sitting	Sitting	Sitting	Sitting	Sitting
25	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
26	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
27	Standing/Entrance	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
28	Leisure Walking	Leisure Walking	Standing/Entrance	Standing/Entrance	Leisure Walking
29	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
30	Sitting	Sitting	Sitting	Sitting	Sitting
31	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
32	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
33	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
34	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
35	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
36	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
37	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
38	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
39	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance
40	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
41	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
42	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
43	Sitting	Sitting	Sitting	Sitting	Sitting
44	Sitting	Sitting	Sitting	Sitting	Sitting
45	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
46	Sitting	Sitting	Sitting	Sitting	Sitting
47	Sitting	Sitting	Sitting	Sitting	Sitting
48	Sitting	Sitting	Sitting	Sitting	Standing/Entrance

49	Sitting	Sitting	Sitting	Sitting	Sitting
50	Leisure Walking	Leisure Walking	Standing/Entrance	Leisure Walking	Leisure Walking
51	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
52	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
53	Sitting	Sitting	Sitting	Sitting	Sitting
54	Sitting	Sitting	Sitting	Sitting	Sitting
55	Sitting	Sitting	Sitting	Sitting	Sitting
56	Sitting	Sitting	Sitting	Sitting	Standing/Entrance
57	Sitting	Standing/Entrance	Sitting	Sitting	Standing/Entrance
58	Standing/Entrance	Standing/Entrance	Standing/Entrance	Standing/Entrance	Leisure Walking
59	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
60	Sitting	Sitting	Sitting	Sitting	Sitting
61	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
62	Standing/Entrance	Standing/Entrance	Sitting	Sitting	Standing/Entrance
63	Sitting	Sitting	Sitting	Sitting	Sitting
64	Sitting	Sitting	Sitting	Sitting	Sitting
65	Sitting	Sitting	Sitting	Sitting	Sitting
66	Standing/Entrance	Standing/Entrance	Sitting	Standing/Entrance	Standing/Entrance
67	Sitting	Sitting	Sitting	Sitting	Sitting
68	Sitting	Sitting	Sitting	Sitting	Sitting

Table 10: Comfort Criteria Derived From Gust Wind Speeds – Configuration 3