DESKTOP WIND MICROCLIMATE STUDY

Axis House, Sipson

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SUMMARY

Potential wind effects were assessed at the Axis House, Sipson site.

Consideration was given to the potential impact of the proposed development on local thoroughfares, building entrances, amenity spaces and bus stops.

Various potential risk factors for raised wind speeds were considered, as well as potential mitigating factors.

Allowing for the mitigating factors, no potentially significant risks of strong winds were identified. The only risk of uncomfortable winds are located on the balconies to the west of the site, where wind conditions could be reduced through the use of targetted solid or porous screening, or limiting the use in these areas.

Except for those areas of the balconies identified, wind conditions around the proposed development are expected to be entirely suitable for the intended usage.

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1 INTRODUCTION

This report outlines the results of a desktop-based wind microclimate analysis of the proposed Axis House development in Sipson, UK.

2 GUIDANCE

The assessment was performed with reference to the LDDC variant of the Lawson Comfort Criteria. The Lawson Criteria are well-established in the UK for quantifying wind conditions in relation to build developments and, although not a UK 'standard', the criteria are recognised by local authorities as a suitable benchmark for wind assessments.

The National Planning Practice Guidance (NPPG) 2023. The NPPG identifies the potential for tall and large buildings to affect the wind microclimate. The National Design Guide (2023) states in Paragraph 135 that: "Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily"

3 METHOD

3.1 ASSESSMENT METHODOLOGY

The assessment was performed as a desktop study, combining analysis of wind data from a local weather station with qualified assessment of any likely effects that the development may have on local wind conditions.

The assessment was performed by an experienced wind engineer with 9 years specific experience of performing wind microclimate studies.

The most common effects that a development could have on local wind conditions are as follows:

- Downwash:
  - High speed airflow from higher in the earth boundary layer being directed down to ground level by a building face.
- Corner flows:
  - Acceleration of the airflow due to the large pressure gradients around sharp corners.
- Channelling:
  - Acceleration of the airflow due to the flow paths being constrained between multiple buildings.

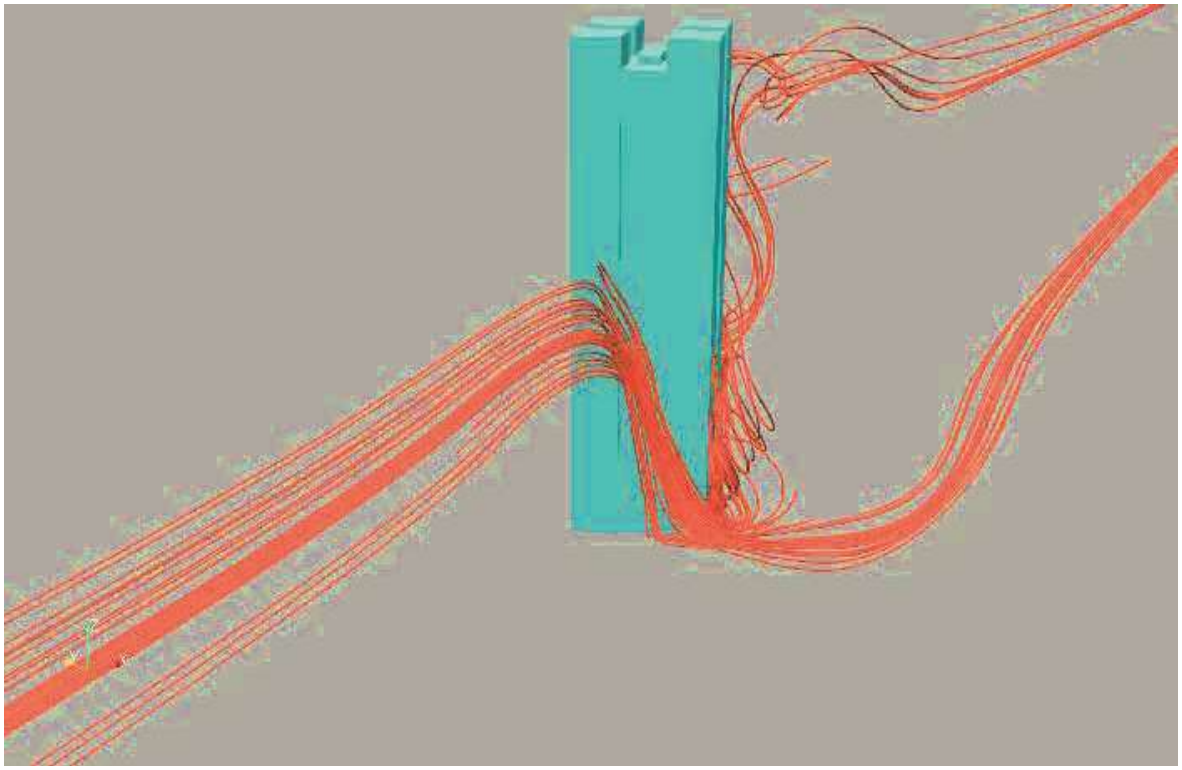

Fig. 01: Downwash

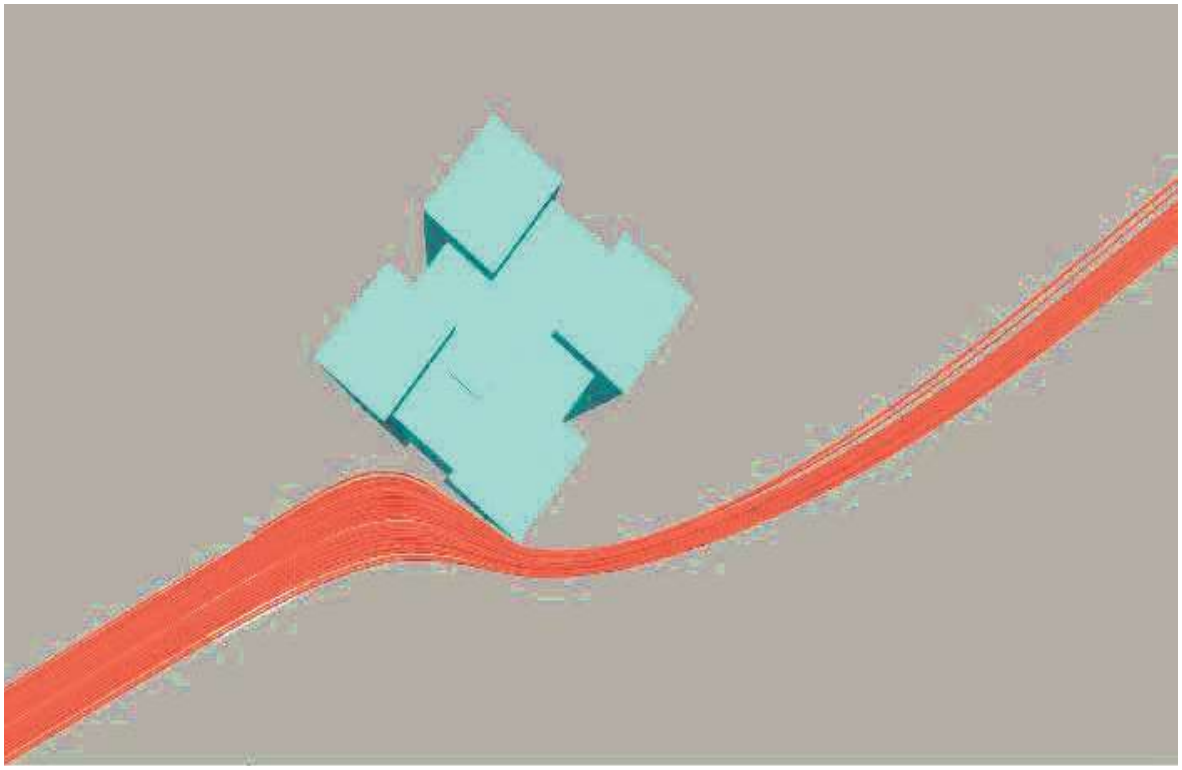

Fig. 02: Corner Flows

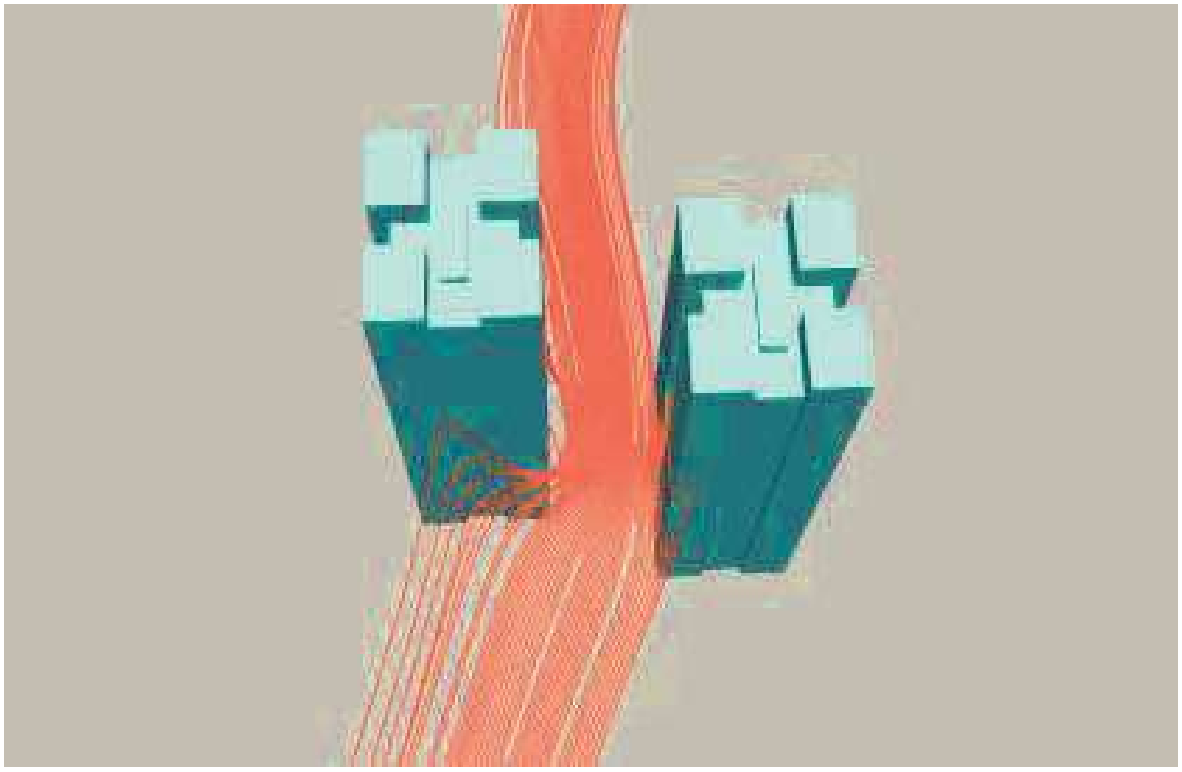

Fig. 03: Channelling

3.2 SITE GEOMETRY

The proposed development is shown in Figure 4.

The location of the proposed development is shown in Figure 5. The site is surrounded predominately by low-rise residential areas.

Fig. 04: The Proposed Development (east elevation)

Fig. 05: The Surrounding Area of the Proposed Development

3.3 WIND DATA ANALYSIS

30 years of wind data were obtained for Heathrow airport. The site is 1km from the weather station at the airport. The location of the site relative to the airport is shown in Figure 6.

Seasonal wind roses were created for the weather station. These are shown in Figure 7.

The dominant wind direction is south-westerly.

There is also a secondary dominant wind direction from the west, and from the north east during the spring.

The dominant wind direction for high wind speeds (hourly wind speeds >8m/s at 10m height at the airport) is 210°, stronger winds are most likely to occur in winter.

There are also significant high wind speeds from 240°.

Fig. 06: Relative Locations of Site and Weather Stations

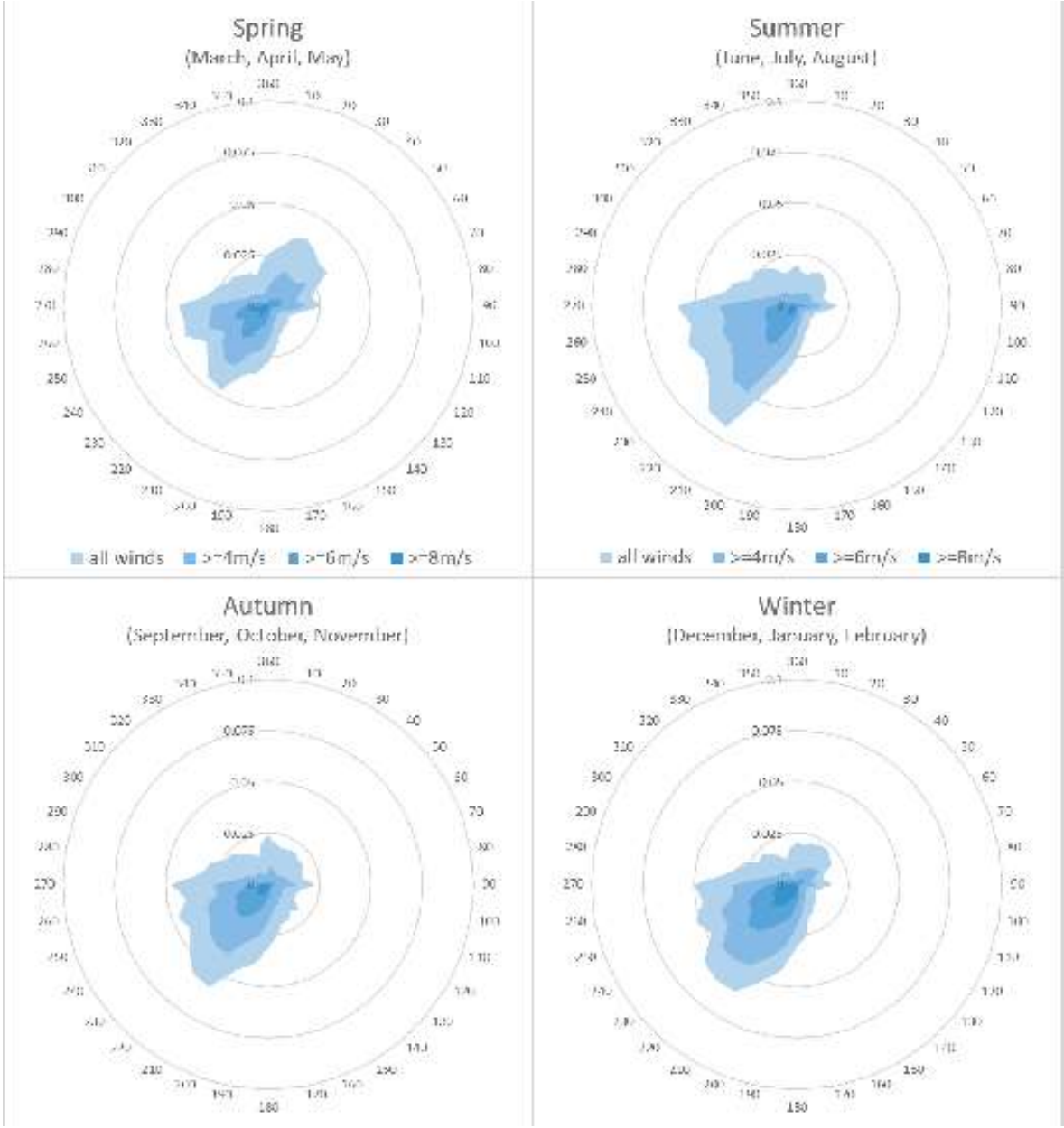

Fig. 07: Wind Roses for Heahtrow airport (1990-2020)

3.4 TARGET CONDITIONS

For a mixed-use urban area within which the Site is located, the desired wind microclimate would typically need to have areas acceptable for sitting, standing (including at entrances of buildings) and walking use. A description of the comfort categories to classify wind conditions in accordance with is given below

Table 01: Lawson Comfort Criteria (LDDC variant)

KEY	COMFORT CATEGORY	MEAN WIND SPEED (5% EXCEEDANCE)	DESCRIPTION
	Sitting	4 m/s	Acceptable for outdoor sitting use (e.g. cafés, benches, balconies)
	Standing	6 m/s	Acceptable for main building entrances, pick-up / drop-off points and bus stops
	Walking (leisure)	8 m/s	Acceptable for strolling
	Walking (business)	10 m/s	Acceptable for external pavements, walking purposefully without lingering
	Uncomfortable	>10 m/s	Not comfortable for regular pedestrian access

Table 02: Lawson Safety Criteria (LDDC variant)

KEY	SAFETY CATEGORY	MEAN WIND SPEED (0.022% EXCEEDANCE)	DESCRIPTION
	No Safety Exceedance	<15 m/s	
	S15 (Distress)	>15 m/s	Unsafe for frail individuals, or cyclists
	S20 (Safety)	>20m/s	Wind conditions considered unsafe for all users

Any areas which are predicted to be unsafe (annually) or uncomfortable (for winter) will require mitigation, unless they are in locations where pedestrian access can be controlled in the event of strong winds. This applies to all thoroughfares (for pedestrians) and roads (for cyclists) around the Development.

Any amenity spaces should be suitable for leisure walking in the winter, and for a mixture of sitting and standing in the summer.

Any bus stops should be suitable for standing.

The areas immediately outside any building entrances should be suitable for standing use during winter to provide a "buffer" between the still conditions in interior spaces and the general thoroughfare.

3.5 LIMITATIONS & ASSUMPTIONS

This study is a desktop study. This means it does not include any modelling of the actual airflow around the site. Hence any atypical local microclimatic features will not be captured.

The nature of a desktop study means that all results and conclusions are qualitative, and it is not possible to draw quantitative conclusions.

4 RESULTS

4.1 GENERAL THOROUGHFARES

Figure 8 shows the proposed development, with certain key features with regards to wind microclimate highlighted.

The proposed development, at 7 floors, is tall enough to be classified as a tall building (in accordance with the 2021 London Plan[1]) and needs to be assessed for risk of downwash.

From the dominant (south westerly) wind direction, the proposed development is exposed to the wind so poses a risk of creating downwash. This risk would be greatest at the corners (marked A and B in Figure 8).

There is a significant mitigating factor in the form of both the existing trees along Bath Road, and also the proposed tree planting along the southern edge of the site (which can be seen in Figure 8). These will absorb energy from the wind and would be expected to ensure that conditions are suitable for leisure walking at worst.

From the second dominant (westerly) wind direction, the proposed development is immediately adjacent to the 4 storey Strata House. This will provide significant shelter from this wind direction, and no adverse wind effects would be expected.

From the north east (key wind direction during spring) the proposed development has low-rise residential buildings in the upwind direction. These will not provide significant protection from the wind, but the landscaping in this area should dissipate the wind and conditionswould be expected to be suitable.

4.2 BUILDING ENTRANCES, AMENITY SPACES & BUS STOPS

The main entrance is marked C in Figure 8. This is recessed, which will typically provide the necessary standing conditions required at entrances. From the spring dominant (north easterly) wind direction, the main entrance is downwind of the building, and the entrance will be suitable for standing at a minimum and therefore be suitable.

There are no proposed amenity spaces which need to be considered.

There are bus stops on Bath Road, but these are not directly adjacent to the proposed development so it would not be expected to impact on wind conditions at these locations.

4.3 WINTER GARDENS & BALCONIES

Figures 9 and 10 show the level 6 Balconies and winter gardens on level 5 respectively.

All winter gardens are recessed, and therefore should provide shelter from the winds and therefore be suitable for use in summer.

The balconies on level 6 are more exposed than the winter gardens, as such there is a higher risk of raised winds. When balconies are exposed, the main risks occur across corners that face the dominant winds. In this instance these areas are marked with a letter D in Figure 9. These areas are most at risk of raised winds. The risk of raised winds can be reduced by using solid balustrading in these areas or porous screens to dissipate the wind speeds. The use of the areas near the corners of the balconies could be limited also, to ensure suitable conditions across all areas.

1https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

Fig. 08: Scheme Landscaping Plan

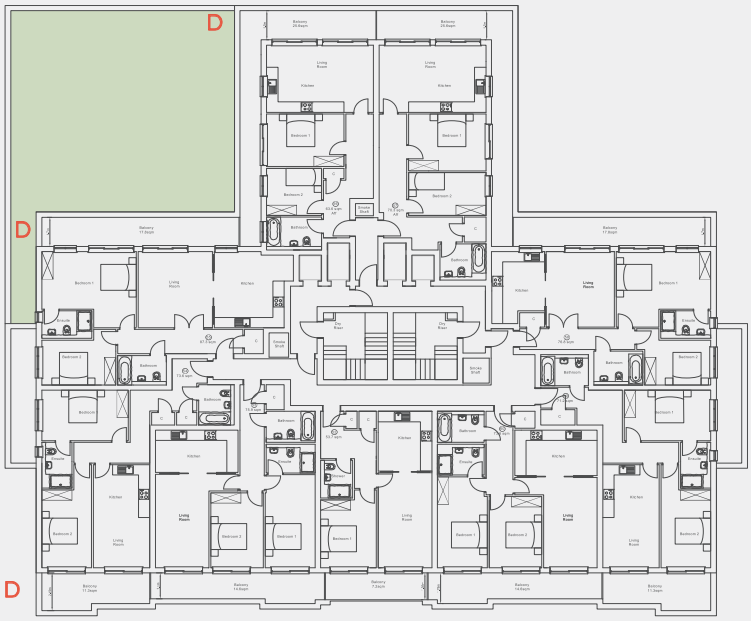

Fig. 09: Level 6 Plan showing the Southern and Northern Balcony Layout.

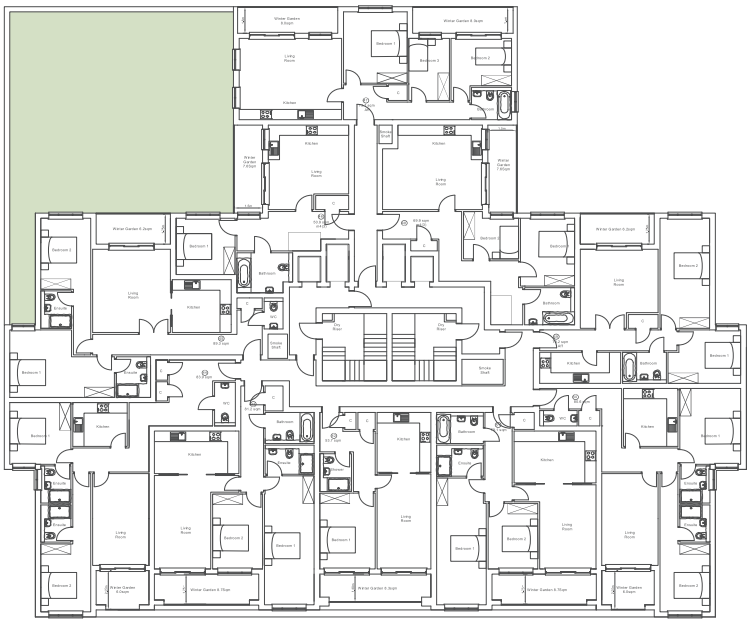

Fig. 10: Level 5 Winter Gardens Layout

5 CONCLUSIONS

Potential wind effects were assessed at the Axis House, Sipson site.

Consideration was given to the potential impact of the proposed development on local thoroughfares, building entrances, amenity spaces and bus stops.

Various potential risk factors for raised wind speeds were considered, as well as potential mitigating factors.

Allowing for the mitigating factors, no potentially significant risks of strong winds were identified. The only risk of uncomfortable winds are located on the balconies to the west of the site, where wind conditions could be reduced through the use of targetted solid or porous screening, or limiting the use in these areas.

Except for those areas of the balconies identified, wind conditions around the proposed development are expected to be entirely suitable for the intended usage.