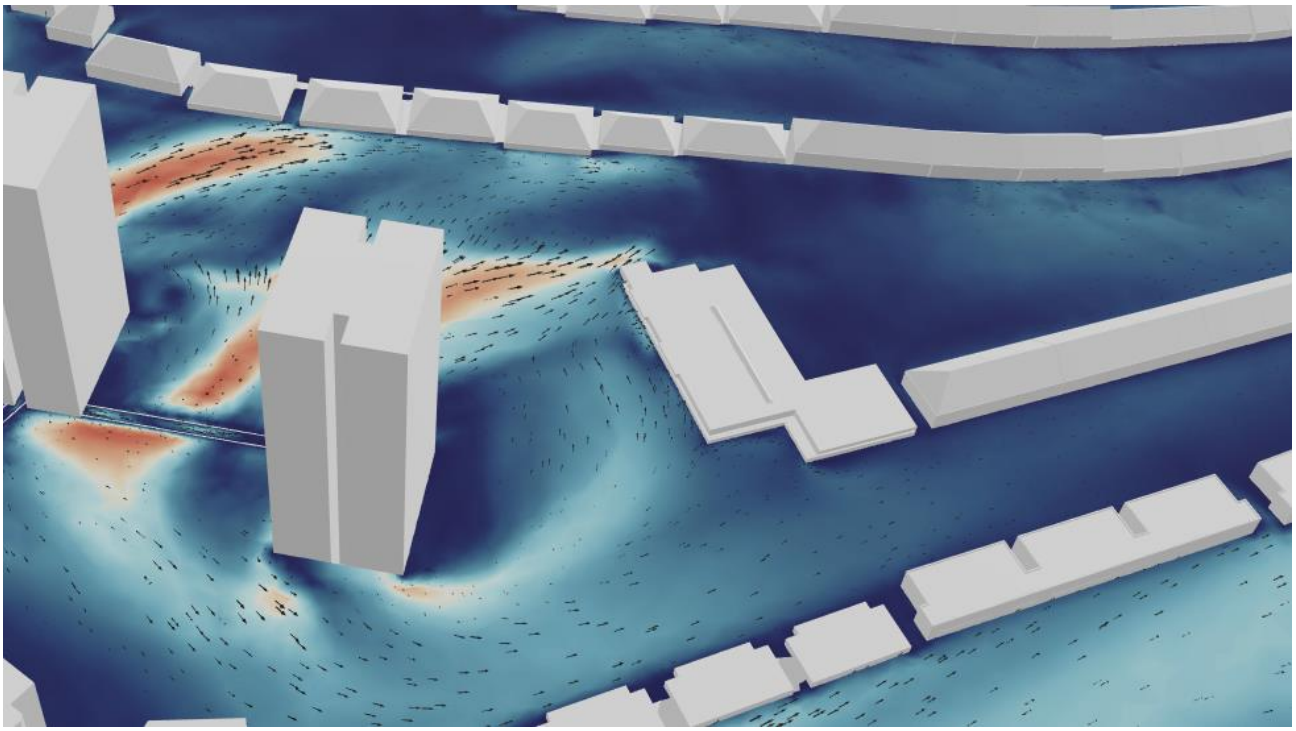
Abbey Area Phase 2
Wind Impact Assessment
May 2020

Pollard Thomas Edwards



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Date: 25/05/2020, Version 4.0 – Planning submission
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Checked: Roger Holdsworth

Cover Image: Abbey Phase 2 proposed site with south west wind effects

1 Executive Summary

This wind impact assessment and report presents both qualitative and quantitative wind microclimate analysis for the proposed Abbey phase 2 development using Computational Fluid Dynamic (CFD) simulations. It has been prepared by the Environmental Design team at Pollard Thomas Edwards, with verification from Wind Engineers at Ingrid Cloud CFD wind simulations.

The report contains the description of the applied data, methodology and results. The pedestrian comfort and safety are analysed with the Lawson-based comfort criteria, visualised on the proposal to depict wind comfort ratings. This is the recommended methodology for modelling buildings in London, and this report has been written in response to planning policy guidance for wind microclimate by Camden [1] and the London Plan 2016 [2].

The results show that the proposed building does not have significant negative impacts on the surrounding area or neighbouring buildings. The pedestrian comfort of the site and surroundings is dominated by the existing 2 towers, remaining unchanged by this proposal. The entrances of the proposed building are acceptable for their use; their comfort is acceptable for short-term activities. External amenity areas within the site boundary are also considered acceptable for use. Some external areas are not considered comfortable for sitting or standing, but are acceptable for strolling and jogging. The proposal does not include seating areas within the open space, and the proposed use is for walking and jogging only. The existing service area between the 2 existing tall buildings has been identified as uncomfortable for all pedestrian activity in winter (Quarter 1), and acceptable only for walking and jogging in summer. This condition remains unchanged for the proposed scenario where this space is changed to a car park. The existing area of amenity to the east of Casterbridge house is deemed uncomfortable for sitting or standing, but acceptable for walking or jogging. Additional tree planting in this area will improve comfort conditions for pedestrians in the park. The proposal will also mitigate the wind effects of the 2 towers by proposing additional tree planting around the amenity space. This wind impact assessment shows that the proposal is in keeping with relevant local planning policy described in section 2.

2 Planning Policy

This wind impact assessment and report meets the following relevant national and local planning policy:

2.1 National Planning Policy Framework (NPPF, 2019)

2.2.1 This contains no specific guidance on wind, although local planning policies are expected to align with the principles of NPPF Section 12, *'Achieving well designed places'*, within which building height and microclimate is a key consideration.

2.2 The London Plan (2016)

The London Plan (Policy 7.6) says "Architecture seeks to ensure that buildings and structures do not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and microclimate."
London Plan policy on tall and large buildings (policy 7.7) states that tall buildings, among other things, should not affect their surroundings adversely in terms of microclimate and wind turbulence.

2.3 Camden Planning Guidance – Amenity - November 2017

Camden has the following planning guidance in section 7 of its guidance for Amenity [1]:

"7.0 *New developments should consider the local wind environment, local temperature, overshadowing and glare, both on and off the site. Buildings taller than their surroundings may cause excessive wind in neighbouring streets and public areas. Where poor wind conditions already exist, reasonable attempts must be made to improve conditions.*

7.1 The purpose of this guidance is to ensure that appropriate standards are met in the design of buildings and outdoor features to ensure that suitable safety and comfort levels are achieved in terms of wind and microclimate. It relates to Camden Local Plan Policy A1 Managing the impact of development and Policy D1 Design in relation to tall buildings (paras 7.35-7.38).

3 Description of the wind assessment site area

The entire 3D model of the proposed site and the surrounding area is used for the numerical simulation as depicted in Figure 1. The surrounding neighbourhood is included in the wind model to improve the accuracy of results. The proposed site is placed in the centre and the domain spreads 580m in x-direction(east-west), and 470m in y-direction (North-South) to include all the adjacent streets and buildings.

In Figure 2, different regions of interest are marked in order to properly describe their comfort. The proposed building is labelled B1 with the main entrance marked with a red arrow and external areas shown as A1-A4. The proposed building (B1) is a 2-storey Health Centre, and the site includes new landscaping and car parking.

Figure 1: Site location plan showing red line of site boundary and the wider surrounding area analysed in this quantitative wind study.

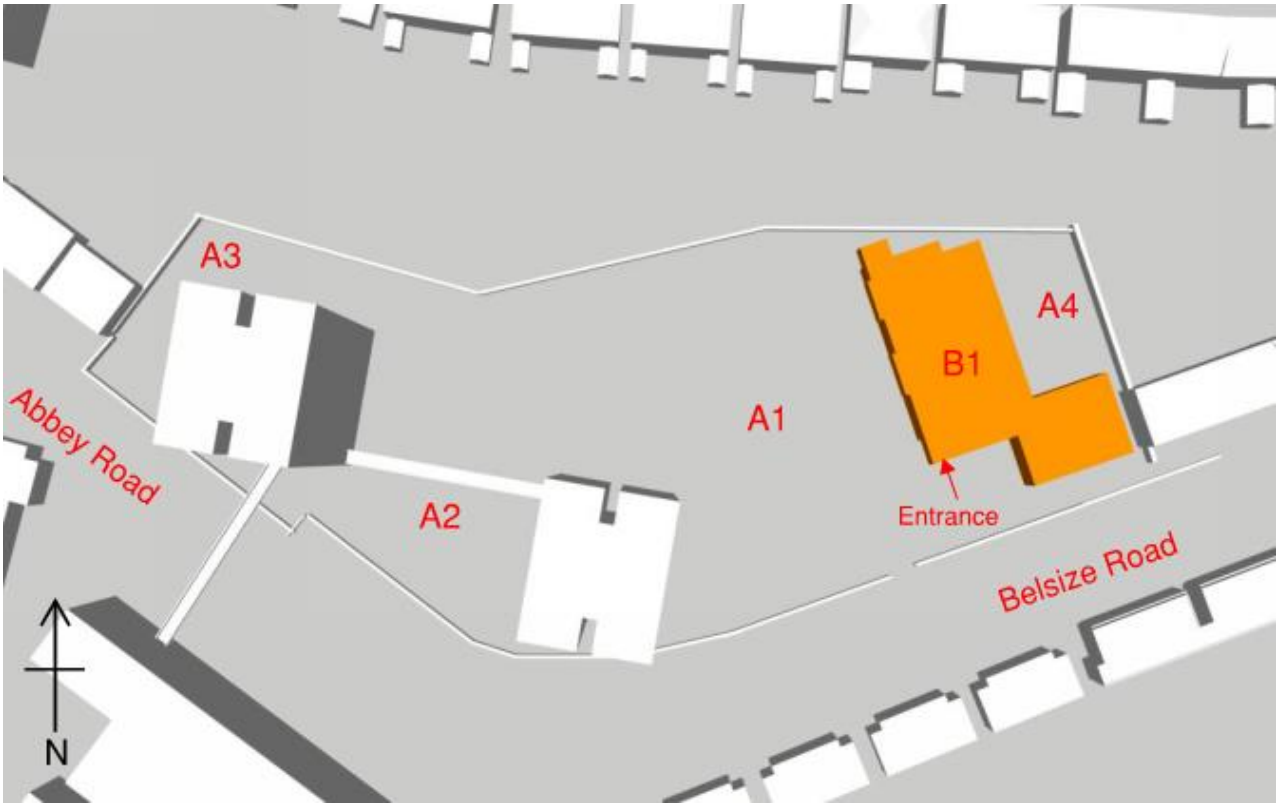


Figure 2: Areas of interest across the site with labels and proposed building highlight in orange.

B1 - Proposed 2-storey building
A1 - Play area and amenity
A2 - Car Park
A3 - Amenity
A4 – Community Garden

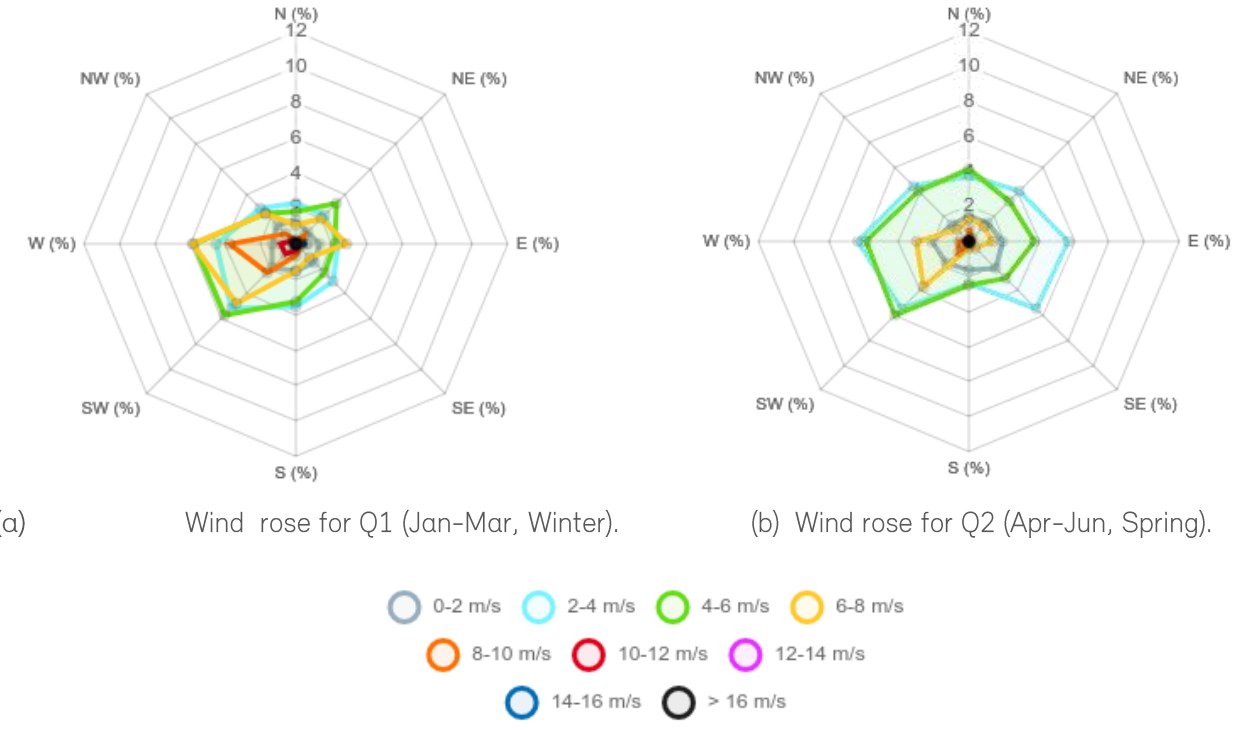
4 Methodology

4.1 Meteorological Data

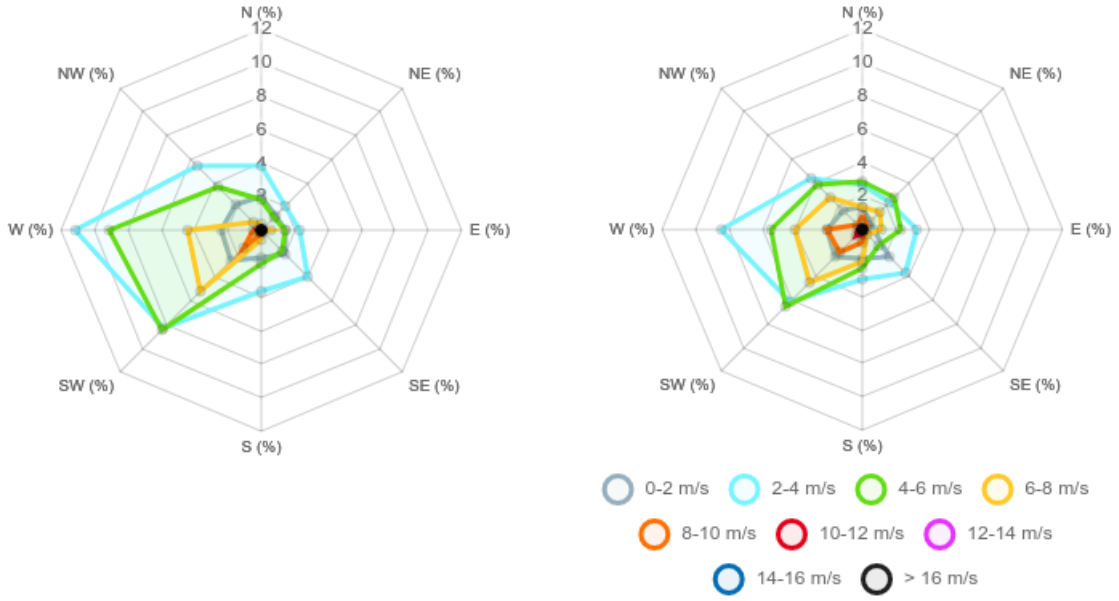
The source of the applied climate data as wind direction, wind magnitude and statistical distribution are crucial. The considered time is one year and wind from eight, equally distributed directions are simulated.

In this study, meteorological data for the site from the last three years provided by the weather service *meteoblue* [3] are applied. With measurements from wind stations and simulations based on NNM technology (NMM - Nonhydrostatic Meso-Scale Modelling), *meteoblue* forecasts the weather with high precision for all sites in the world [4, 5]. For the simulations in this report, wind data from the GPS-coordinates -0.19° *(W)* longitudinal and 51.54° *(N)* latitudinal are used.

The wind speed and its direction is visualised by a wind rose as shown in Figure 3. The wind direction is defined away from the origin e.g. if we compare the wind rose to a clock, a wind from south blows in the direction of midnight. The centred ring represents the percentage in time.



(a) Wind rose for Q1 (Jan-Mar, Winter). (b) Wind rose for Q2 (Apr-Jun, Spring).



(c) Wind rose for Q3 (Jul-Sep, Summer). (d) Wind rose for Q4 (Oct-Sep, Autumn).

Figure 3: Wind rose for the whole year and each quarter

4.2 Pedestrian Comfort using CFD

Computational fluid dynamics (CFD) provides quantitative information of fluid flow which is difficult to measure by experiments. The quantification of the complex wind dynamic around buildings can answer questions concerning life quality, security and the development of the surrounding area.

Since there is only limited guidance for modelling landscape, a solid and reliable approach is taken, i.e. no trees are included in the simulations. The existing and proposed site has mature trees, which will improve the wind conditions illustrated in this model. The goal of this investigation was to ensure the security and comfort of inhabitants and to identify crucial wind effects by numerical simulations. All analysis was conducted at pedestrian level i.e. at 2m, for different activities. The report contains a site description, describes details of the applied methodology, presents the obtained results and concludes with the main findings.

4.3 Lawson Comfort Criteria

Different guidelines to quantify the wind conditions for pedestrians have been established. They measure the percentage of exceedance of the wind speed during a defined time period, but they differ in thresholds, consideration or disregard of gusts (local wind speed) and categories of activities. The Lawson based criteria [6] illustrated in Figure 4 are used in this report meets the Camden Planning Policy Guidance and the London Plan guidance. This analysis uses local weather data and uses eight wind directions to model comfort throughout the year.

The probability exceedance is set to 5%, so conditions will exceed this less than 5% of the time. 6 different comfort categories are defined in the Lawson criteria, depending on the velocity magnitude: *Sitting, Occasional Sitting, Standing, Strolling, Jogging* and *Uncomfortable*, see figure 4.

	0.0 - 2.5 m/s	5 %	Sitting	Acceptable for frequent outdoor sittings use. For example at a restaurant or cafe.
	2.5 - 4.0 m/s	5 %	Occasional sitting	Acceptable for occasional outdoor seating. For example general outdoor spaces.
	4.0 - 6.0 m/s	5 %	Standing	Acceptable for example entrances, bus stops or covered walkways.
	6.0 - 8.0 m/s	5 %	Strolling	Acceptable for slow paced walking with occasional stops.
	8.0 - 10 m/s	5 %	Jogging	Acceptable for jogging, cycling and other lighter exercises.
	> 10 m/s	5 %	Uncomfortable	Not comfortable for regular pedestrian access.
	> 15 m/s	.022 %	Mitigation recommended	Strong wind can occur. Mitigations should be considered.

Figure 4: Lawson pedestrian comfort criteria used in this study

5 Results

5.1 Pedestrian Comfort

Wind comfort criteria are calculated for each quarter of the year. The wind rose in section 4 shows the prevailing wind directions are southwest and west. The wind environment created by those directions are clearly reflected in the pedestrian comfort. The following table shows a summary of the results of the study. These are illustrated in further detail in the following section 5.2:

Area of interest (refer to Figure 5)	Analysis of wind conditions and pedestrian comfort
B1- Proposed building and main entrance	Alongside the building, standing or even sitting is acceptable all year round. Main entrance is well protected and suitable for use. Building has no significant negative impact on the surrounding area.
A1 – Play area and amenity	No significant change from existing conditions. In Q1 and Q4 acceptable for strolling and jogging. In Q2 and Q3 acceptable for standing. Existing conditions will be improved with additional tree planting.
A2 – Car Park	No significant change from existing conditions. In Q2 and Q3 acceptable for strolling and jogging. Uncomfortable conditions in winter (Q1) but acceptable for walking in spring and summer.
A3 - Amenity	No significant change from existing conditions. Acceptable for strolling or jogging. Additional tree planting will help improve uncomfortable conditions in Q1 (Winter).
A4 – Community Garden	Comfortable for sitting all year round.

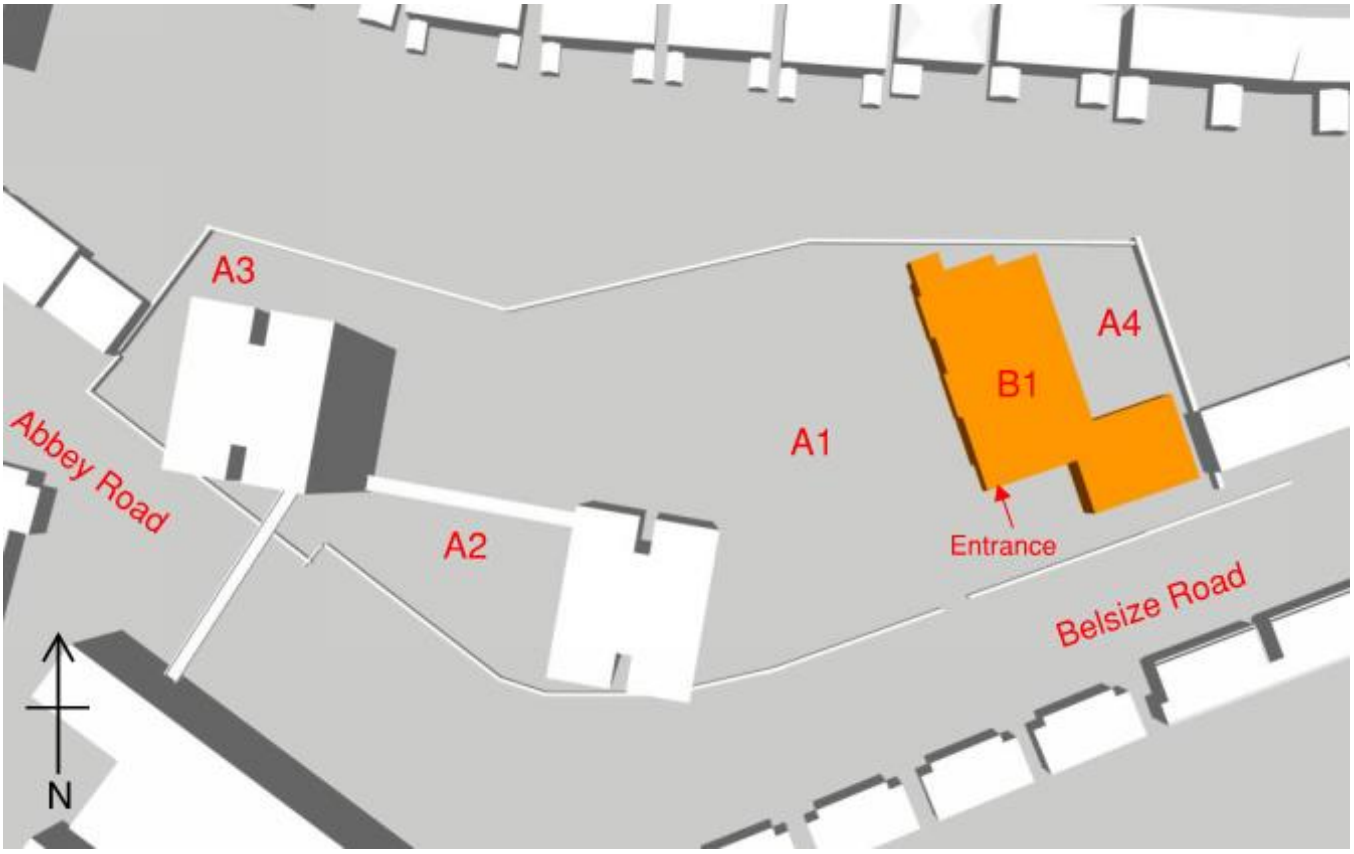


Figure 5: Areas of interest across the site, and summary of resulting wind conditions.

5.2 Lawson based Pedestrian Comfort

Wind comfort criteria calculated and illustrated for the whole year.

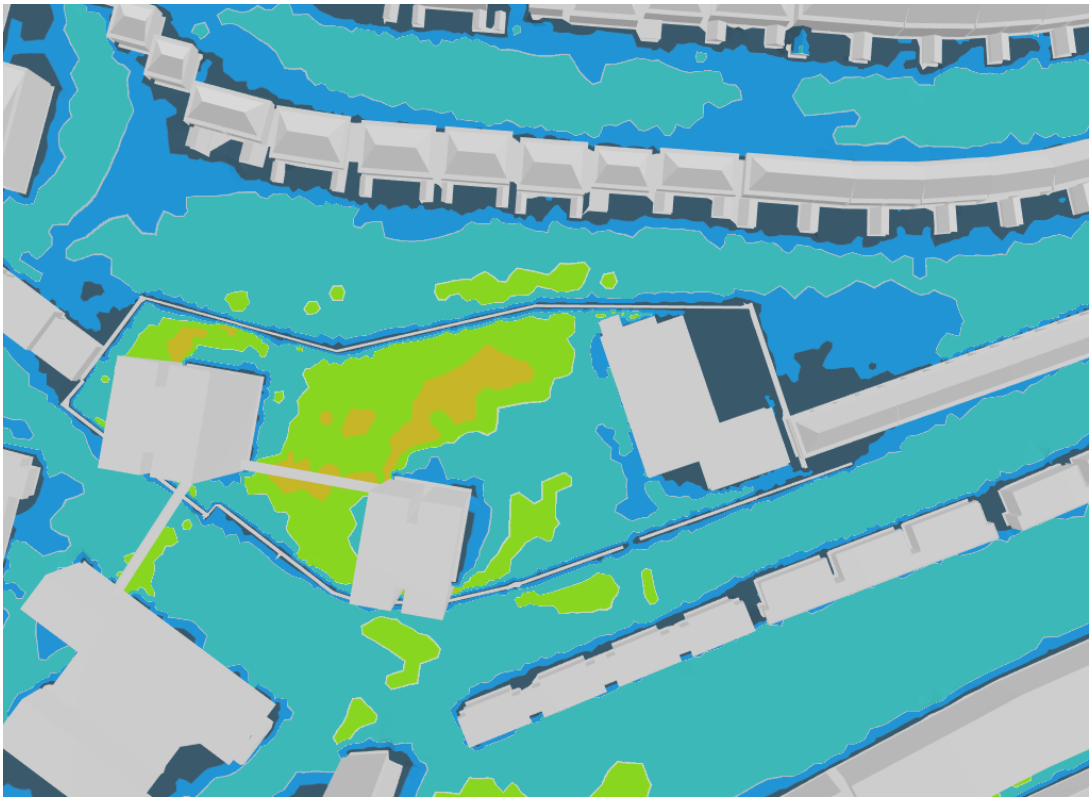


Figure 6: Full Year wind comfort analysis – site plan view

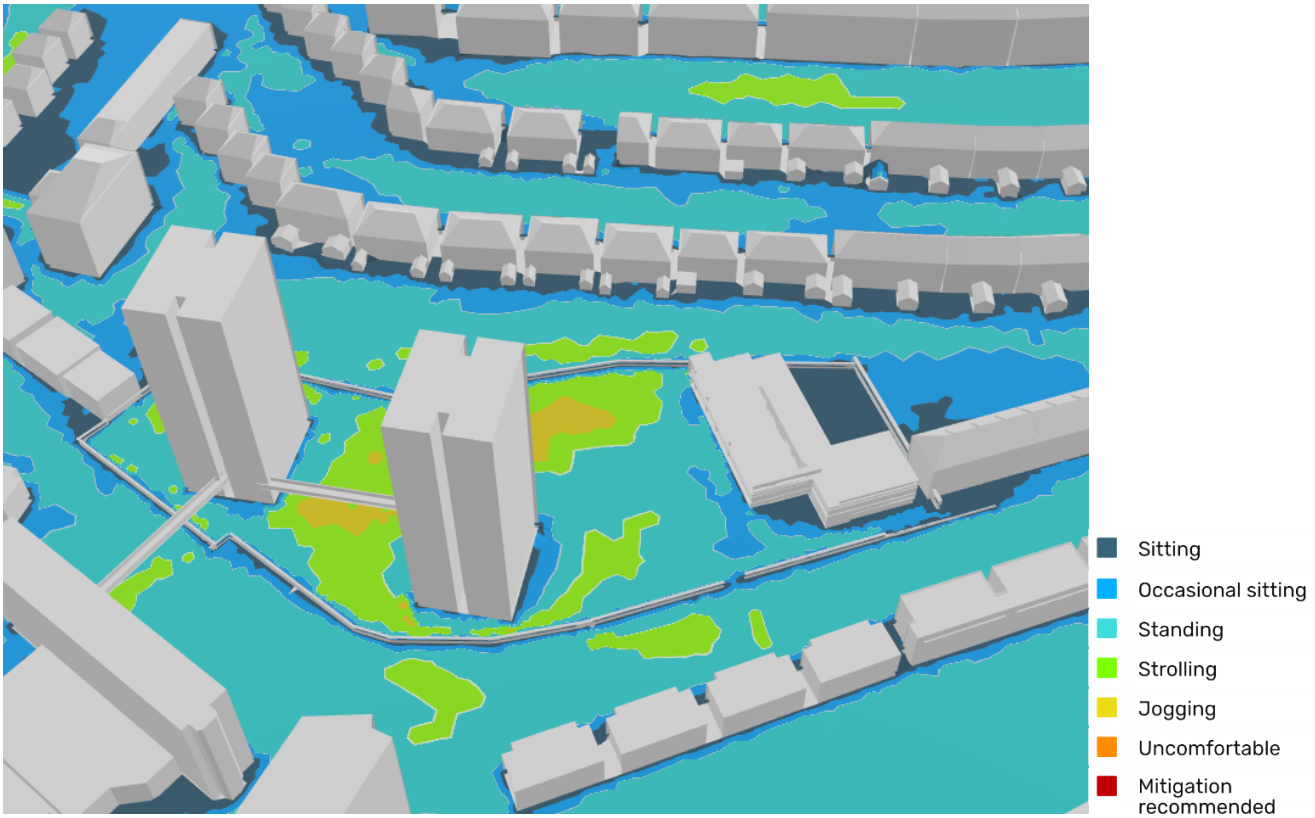


Figure 7: Full Year wind comfort analysis – view of proposed site from south

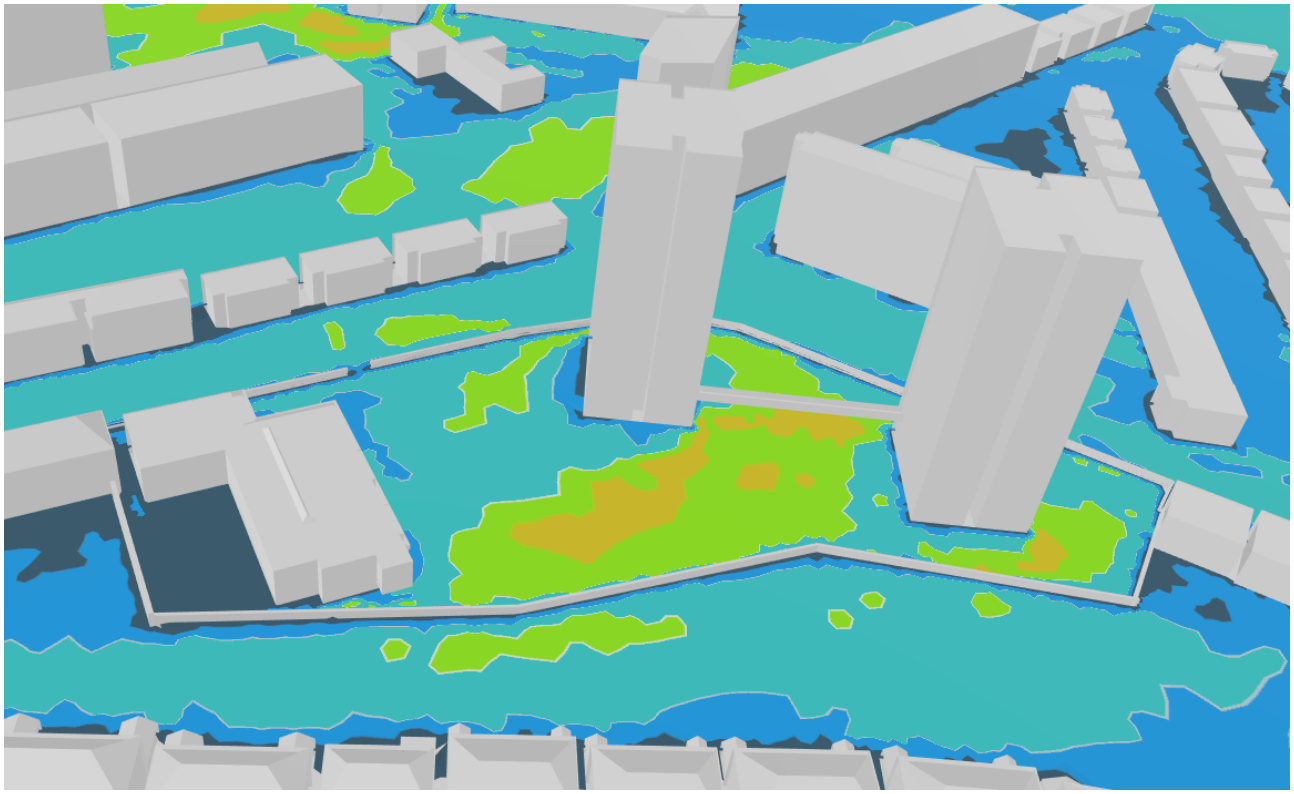


Figure 8: Full Year wind comfort analysis – view of proposed site from north

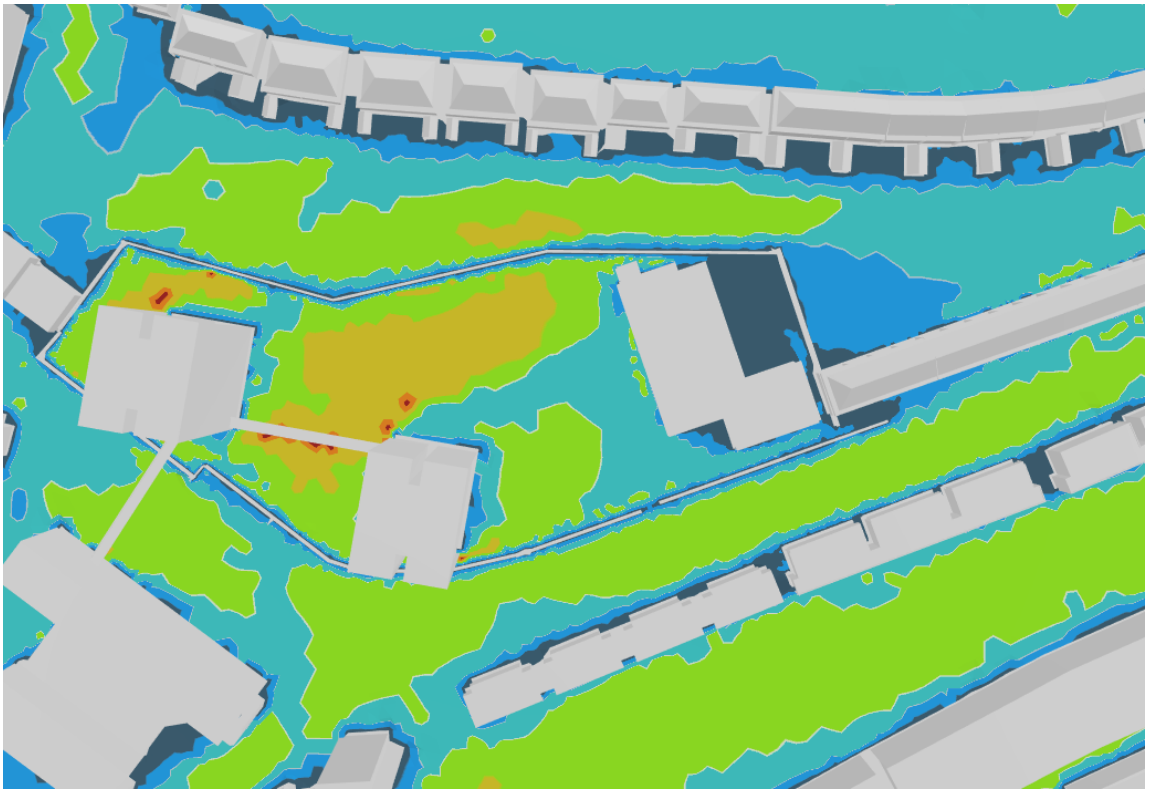


Figure 9: Quarter 1 (Winter) - Proposed site plan with Lawson based pedestrian comfort criteria

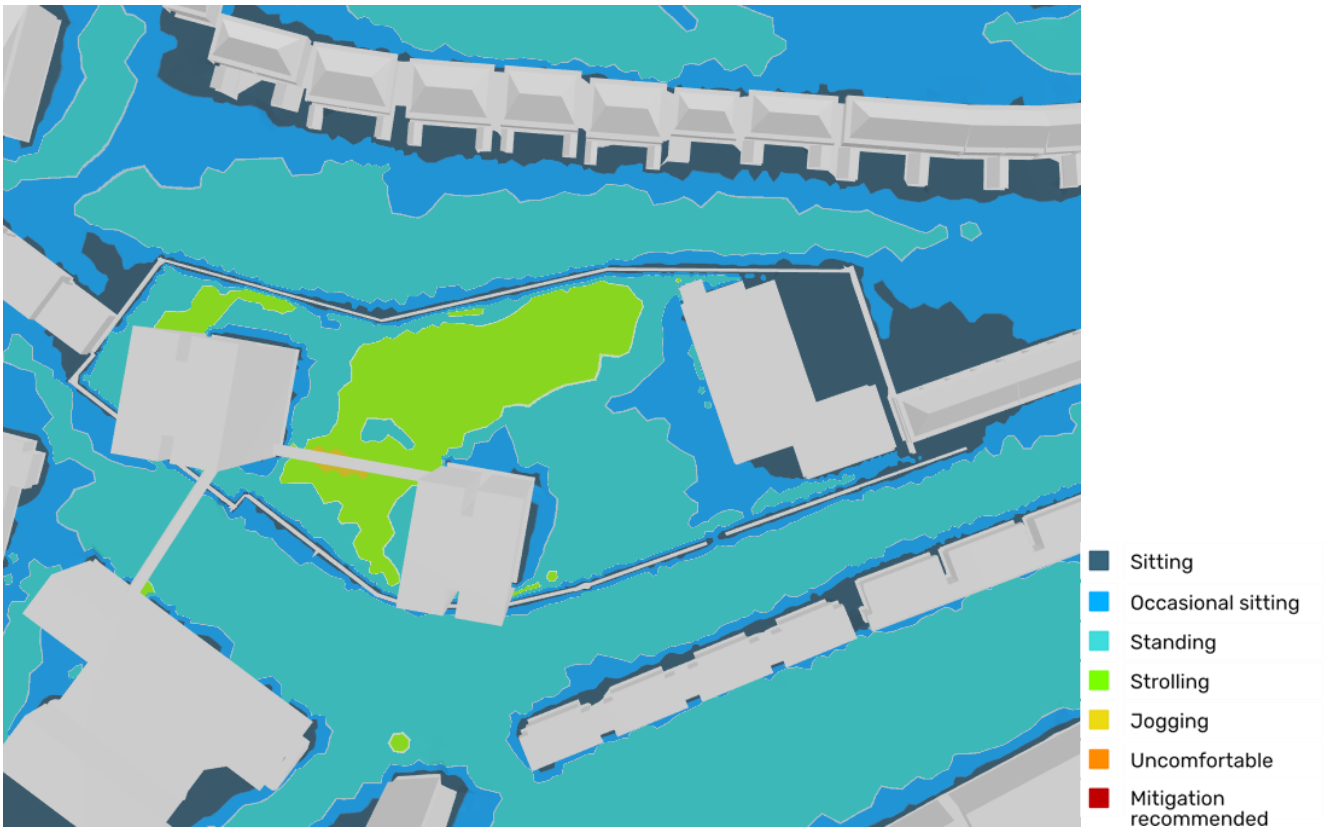


Figure 10: Quarter 2 (Spring) – Proposed site plan with Lawson based pedestrian comfort criteria

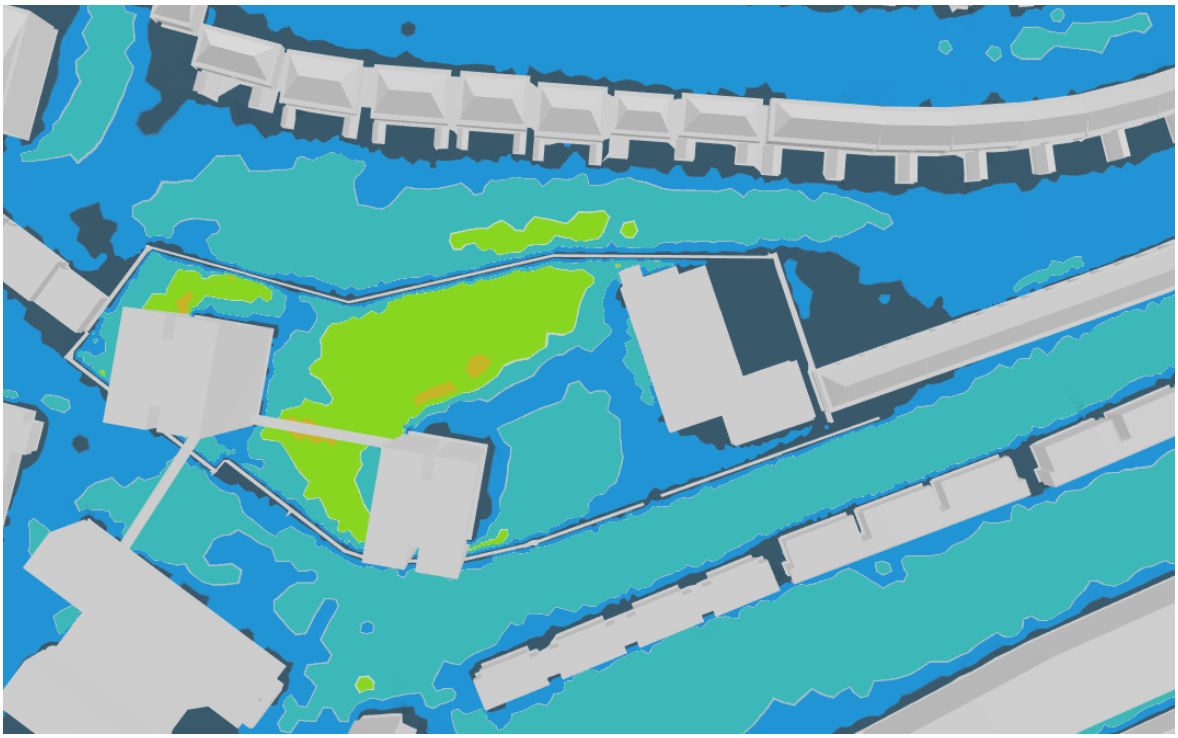


Figure 11: Quarter 3 (Summer) – Proposed site plan with Lawson based pedestrian comfort criteria

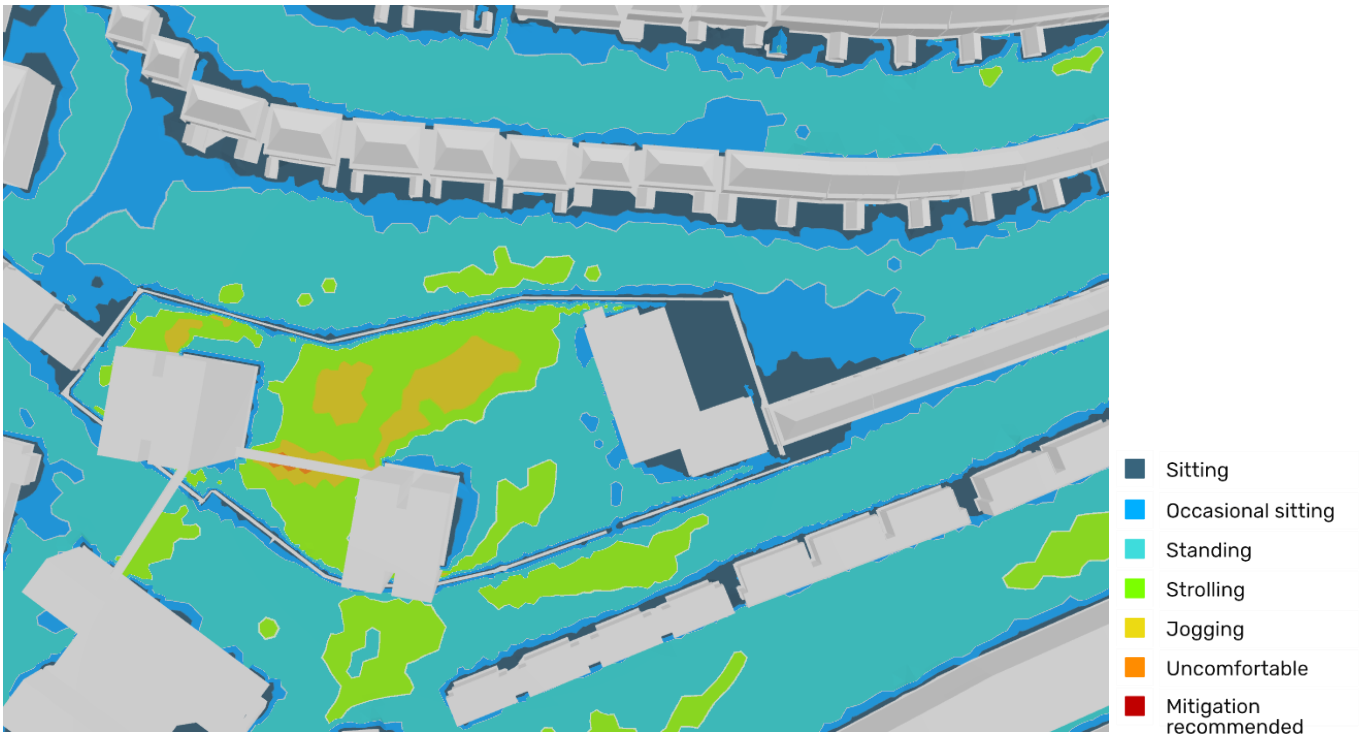


Figure 12: Quarter 4 (Autumn) – Proposed site plan with Lawson based pedestrian comfort criteria

6 Conclusion

This report presents a qualitative and quantitative wind impact assessment for the proposal by analysing the local wind dynamic and evaluating the pedestrian comfort. Building B1, the proposal itself is not significantly affecting wind conditions in the local area, and conditions are suitable for its proposed use. The pedestrian comfort of the site is dominated by the existing 2 towers, remaining unchanged by this proposal, and existing wind conditions will be mitigated by additional tree planting. External amenity areas within the site boundary are considered acceptable for use. The resulting comfort on pedestrian level has been analysed using the Lawson comfort criteria and average annual results illustrated in figure 13 below, and in more detail in section 5 of this report. The results are summarised in Figure 13 and Table 1.

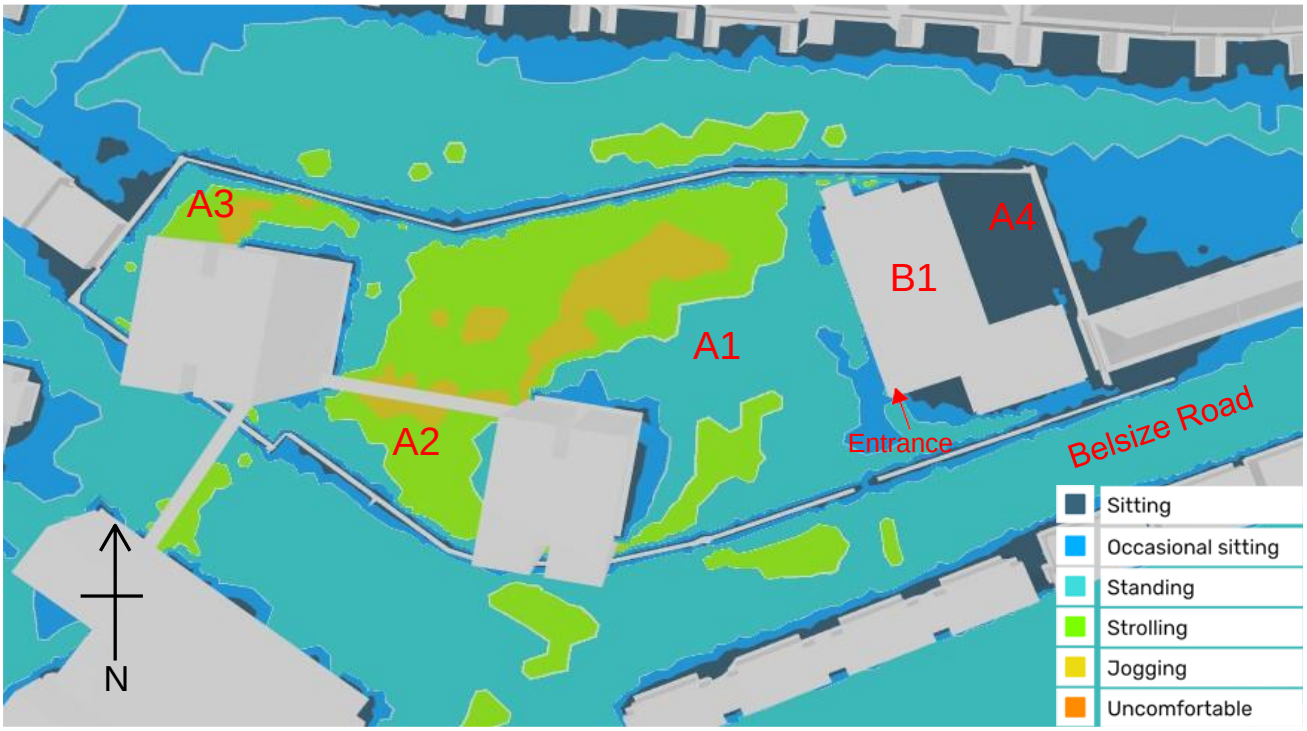


Figure 13: Annual wind conditions and acceptable pedestrian activities

Area of interest	Analysis of wind conditions and pedestrian comfort
B1- Proposed building and main entrance	Alongside the building, standing or even sitting is acceptable all year round. Main entrance is well protected and suitable for use. Building has no significant negative impact on the surrounding area.
A1 – Play area and amenity	No significant change from existing conditions. In Q1 and Q4 acceptable for strolling and jogging. In Q2 and Q3 acceptable for standing. Existing conditions will be improved with additional tree planting.
A2 – Car Park	No significant change from existing conditions. In Q2 and Q3 acceptable for strolling and jogging. Uncomfortable conditions in winter (Q1) but acceptable for walking in spring and summer.
A3 - Amenity	No significant change from existing conditions. Acceptable for strolling or jogging. Additional tree planting will help improve uncomfortable conditions in Q1 (Winter).
A4 – Community Garden	Comfortable for sitting all year round.

Table 1: Summary of results

References

[1] Camden Planning Guidance on Amenity, Section 7: Wind and Microclimate https://www.camden.gov.uk/documents/20142/4834411/Appendix+5+Amenity+.pdf/34969b7e-33b2-55b5-012e-767a35f0a378

[2] London Plan guidance on wind and microclimate: https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-2016- pdf.

[3] https://www.meteoblue.com/.

[4] https://content.meteoblue.com/en/research-development/processes/verification.

[5] https://content.meteoblue.com/en/specifications/weather-model-theory.

[6] https://www.cityoflondon.gov.uk/services/environment-and-planning/planning/design/Documents/city-of-london-wind-microclimate-guidelines.pdf