

BRE Client Report

Wind Microclimate Assessment of the Proposed Partridge Way Development, Haringey

Prepared for: London Borough of Haringey

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Executive Summary

It is proposed to develop a site on Partridge Way in the London Borough of Haringey to create a new nine storey residential building and to landscape an adjoining triangular area to the northeast of the building. The Application Site for the building is currently occupied by single storey residential garages and a paved area.

BRE have been appointed by Haringey Council to undertake a desk study to consider the pedestrian level wind effects around the proposed nine storey building. The proposed landscaped area is not part of this wind microclimate assessment.

The conclusions of this desk study are as follows:

- The wind conditions around the proposed new building on Partridge Way are expected to be suitable for the pedestrian activities of Strolling or Standing in all public realm areas around the development.
- The wind conditions at the main building entrance and at the fire exit and secondary entrances are expected to be suitable for Entrance/Exit use at these locations.
- The proposed development is not expected to generate any adverse wind conditions in the wider existing area or around existing buildings.

In summary: It is expected that the wind microclimate around the proposed Partridge Way development will be suitable for the intended pedestrian activities at all ground level locations on footpaths, public realm areas and adjoining areas. There are not expected to be any adverse impacts on the wind microclimate.

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1 Introduction

It is proposed to develop a site on Partridge Way in the London Borough of Haringey to create a nine storey residential building and to landscape an existing open area to the northeast of the building to create a children's play area. The Application Site for the building is currently occupied by single storey residential garages and a paved area.

The site is triangular and is bounded to the north by Partridge Way, to the southwest by Trinity Road and to the east by existing two storey housing.

BRE have been commissioned by Haringey Council to undertake a desk study to consider the potential pedestrian level wind effects around the proposed new building. The proposed landscaped area is not part of this wind microclimate assessment.

This study has been undertaken by BRE as project number P118564 - 1000 and is based upon proposal number P118564 dated 8th October 2020.

This study is based upon the final scheme freeze design drawings dated April 2021 provided to BRE by Martin Arnolds via email which included images and drawings of the proposed development and the existing site. Selected examples of these images have been incorporated as figures into this report for ease of reference. Various online maps, satellite and street-level imagery resources have also been referred to in order to understand the local context and environs of the site.

2 Methodology

This assessment is based upon the professional opinions of an experienced BRE wind engineering expert who is a Chartered Civil and Structural Engineer with over 30 years of experience in this field. It is recognised that these opinions are qualitative in nature although the assessment of wind speed conditions for the Site is based on measured meteorological data and is therefore quantitative. This approach is widely accepted by planners and developers as being an appropriate methodology to support planning applications.

The professional opinion is based upon the wind effects generated by the buildings themselves, and by their context (i.e. the surrounding buildings and the macro-scale wind environment). This assessment enables potential pedestrian level wind environment issues around the site to be identified.

The purpose of undertaking a desk study is to identify areas of potentially unpleasant winds. However, people perceive the wind differently depending upon what they are doing. For example, people sitting will tolerate less windy conditions than people walking with purpose between locations. This means that an area having unpleasant winds for sitting purposes can be completely suitable for walking.

It is not practical to evaluate every location around a scheme in terms of every pedestrian activity, and a typical activity must therefore be chosen as the basis for making an assessment. For this purpose, the activities of Strolling (leisure-walking) and Standing have been chosen as being the most appropriate benchmarks. Entrances will be assessed separately for suitability for entrances. This is discussed further in Section 6.

It is important to recognise that a location having the potential to have unpleasant wind is not the same as that location being unpleasantly windy. A desk study offers a professional opinion about the likely wind conditions and draws attention to any areas of concern; hence it is qualitative by nature. The behaviour of the wind and its interaction with buildings means that it is not possible to be certain about the actual wind conditions – a quantitative assessment would require a wind tunnel study.

3 Description of the Receiving Environment

3.1 Site Location and Surroundings

The proposed development site is bounded by Partridge Way to the north and by Trinity Street to the southwest. To the east is a terrace of two storey houses. The Application Site is currently occupied by single storey residential garages and a paved area.

To the north of the site are Finsbury House and Newbury House both of which are 15 storeys tall. Further afield the surrounding buildings are mainly two to three storey residential.

Figure 1 shows an aerial views of the site and the immediate surroundings and Figure 2 shows the site in its wider context.



Figure 1 The proposed development site (outlined in red) looking north

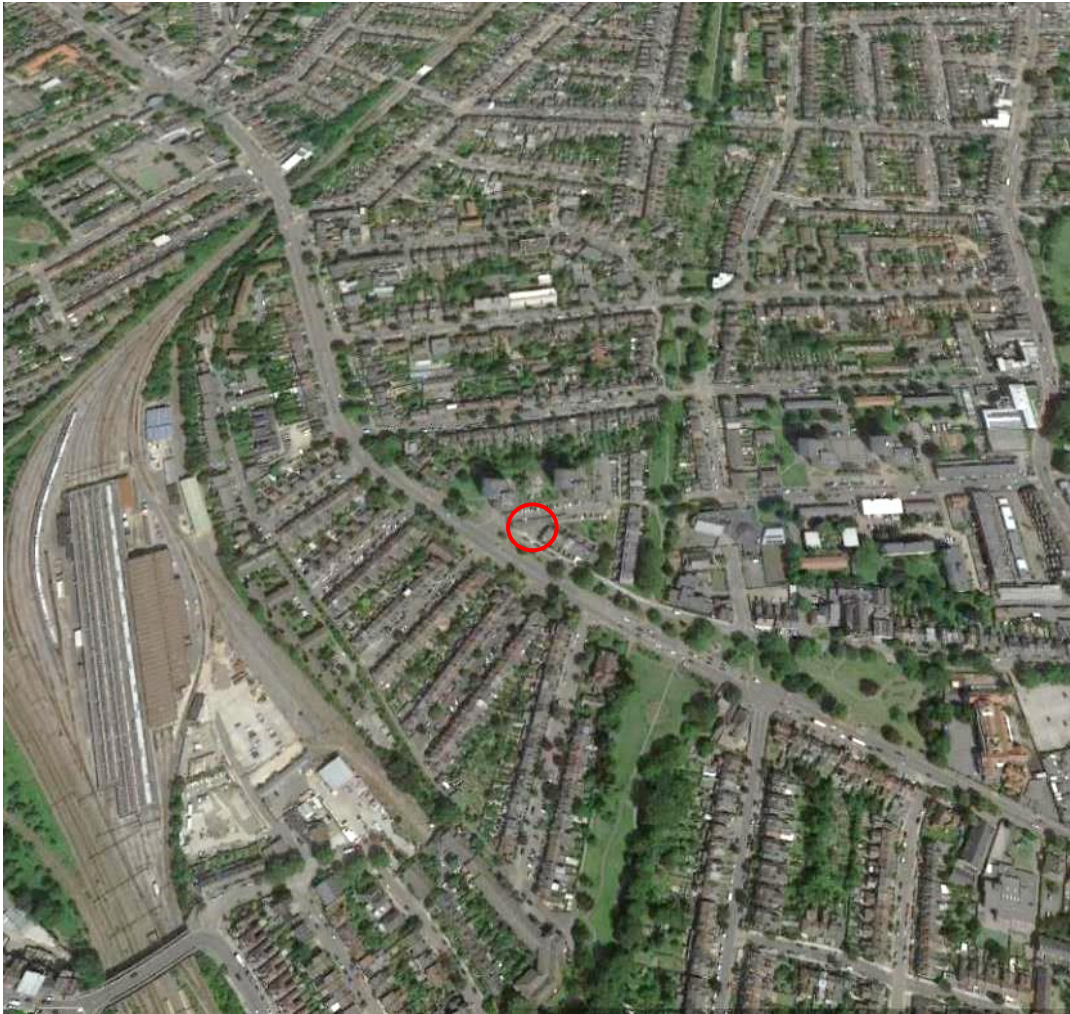


Figure 2 The proposed development site (circled in red) in its wider context

3.2 The Proposed Development

The proposed nine storey development is shown in Figures 3 to 7. Figures 5 to 7 also show the relative height of the proposed development in context with nearby tall buildings.

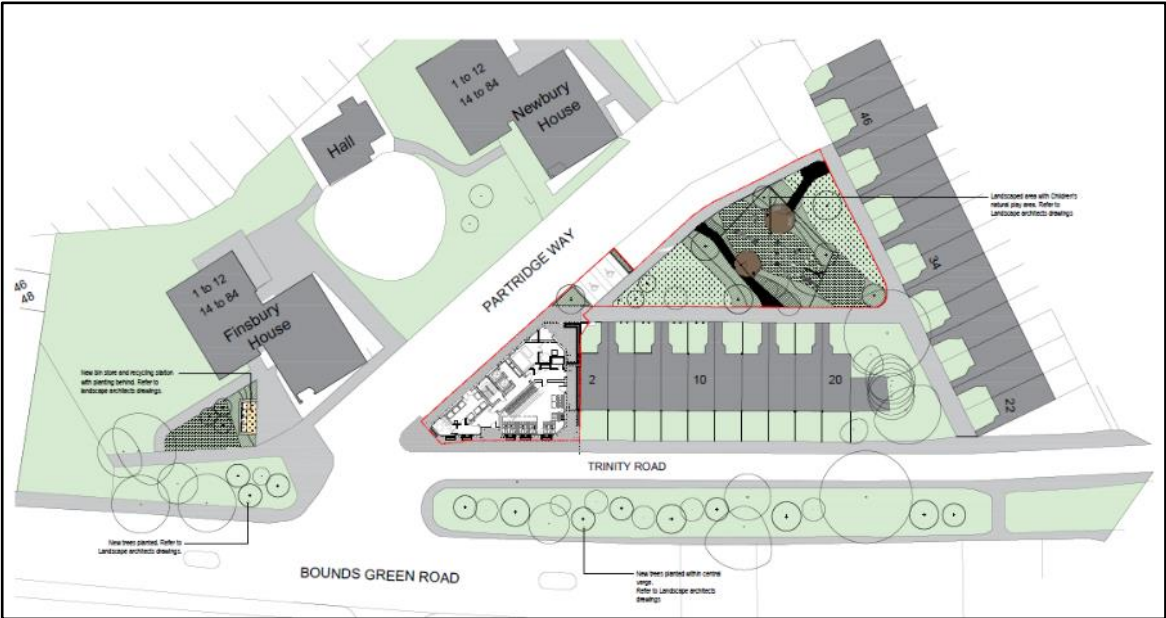


Figure 3 Site plan

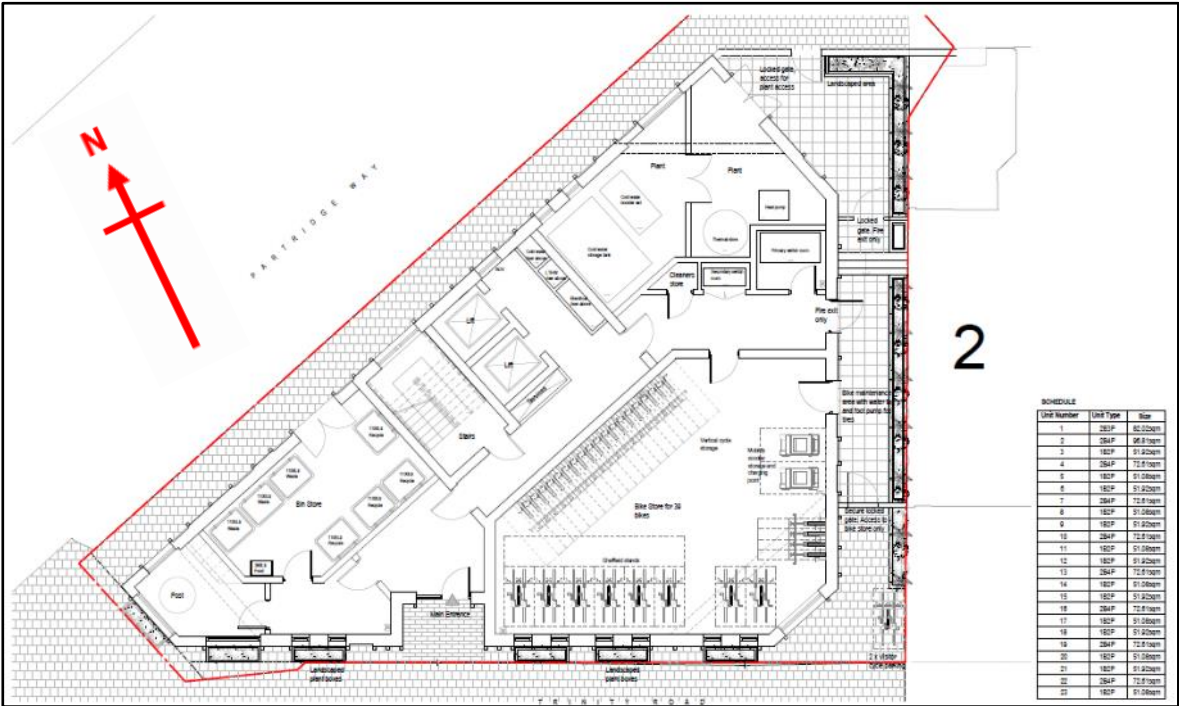


Figure 4 Ground floor plan

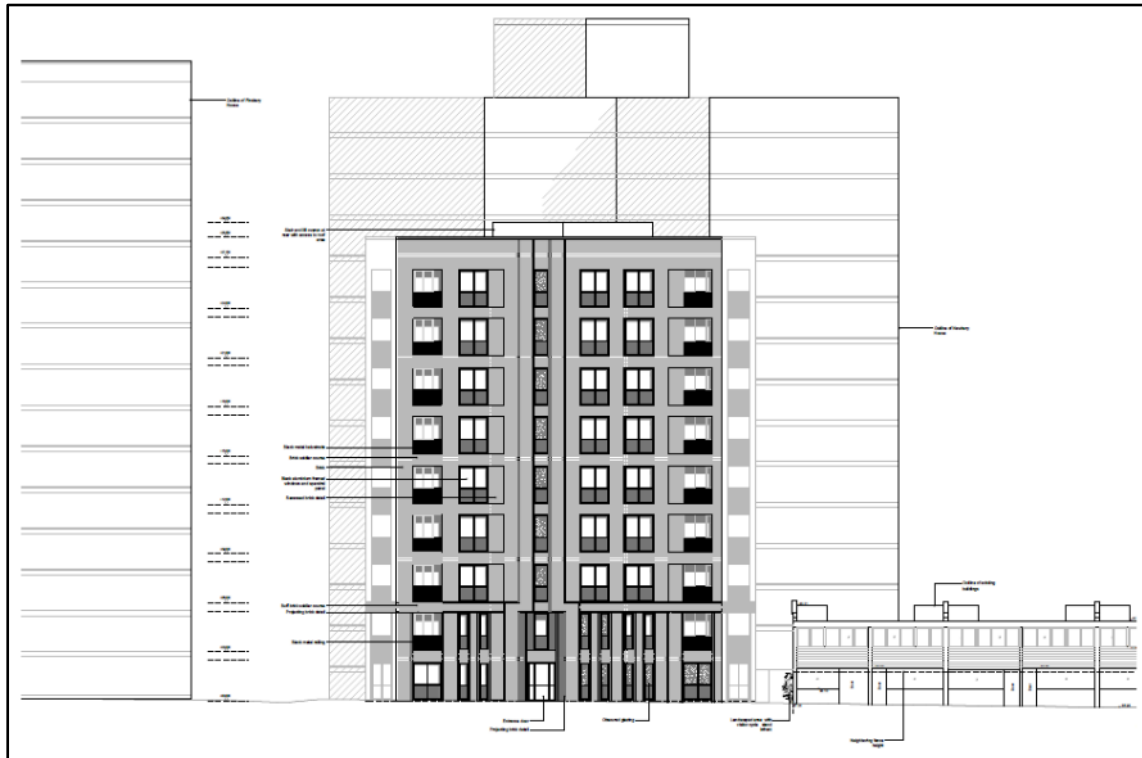


Figure 5 Proposed southwest elevation

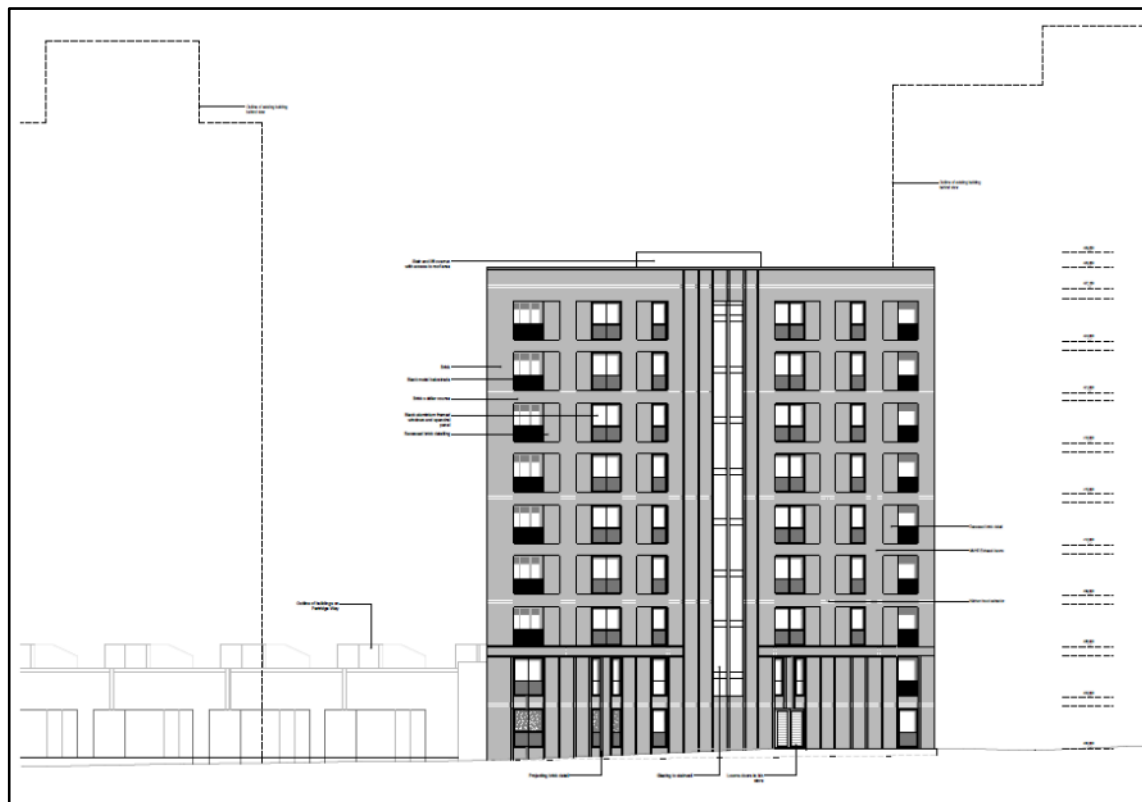


Figure 6 Proposed north Elevation

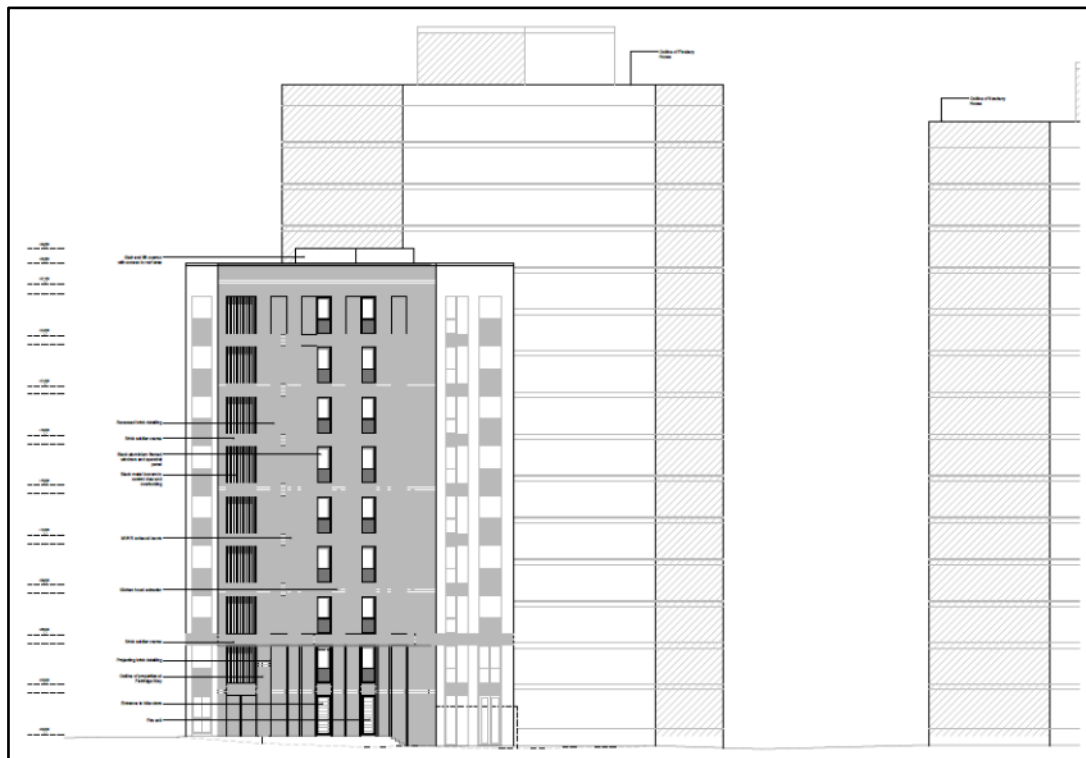


Figure 7 Proposed southeast elevation

4 Comfort Criteria

Wind conditions for pedestrian comfort are generally based on the Beaufort wind scale which describes wind effects on land for a range of mean wind speeds. Table 1 shows the Beaufort wind scale and describes the effects attributable to each wind speed range¹.

Table 1 The Beaufort wind scale (Wind speeds at the height of 10m)

Beaufort scale	Description	Mean wind speed range		Effects
		(m/s)	(mph)	
B0	Calm	0–0.2	0–0.5	No noticeable wind, smoke rises vertically
B1	Light air	0.3–1.5	0.7–3.4	Direction of wind shown by smoke drift but not wind vanes
B2	Light breeze	1.6–3.3	3.6–7.4	Wind felt on face, leaves rustle
B3	Gentle breeze	3.4–5.4	7.6–12.1	Wind extends light flag, leaves in constant motion
B4	Moderate breeze	5.5–7.9	12.3–17.7	Raises dust and loose paper; hair disarranged, clothing flaps
B5	Fresh breeze	8.0–10.7	17.9–24.0	Small trees in leaf begin to sway; limit of agreeable wind on land
B6	Strong breeze	10.8–13.8	24.2–30.9	Umbrellas used with difficulty; force of the wind felt on the body; wind noisy, frequent blinking
B7	Near gale	13.9–17.1	31.1–38.3	Inconvenience felt when walking; difficult to walk steadily; hair blown straight
B8	Gale	17.2–20.7	38.5–46.4	Generally impedes progress; walking difficult to control; great difficulty with balance in gusts
B9	Strong gale	20.8–24.4	46.6–54.7	People blown over by gusts; slight structural damage
B10	Storm	24.5–28.4	54.9–63.6	Seldom experienced inland; trees uprooted, significant structural damage
B11	Violent storm	28.5–32.2	63.8–72.1	Very rarely experienced; accompanied by widespread structural damage
B12	Hurricane	> 32.3	> 72.4	Countryside devastated; winds of this force only occur in hurricanes and tornadoes

This wind microclimate assessment is based upon a set of comfort criteria developed by Lawson with respect to people's perception of the suitability of the wind conditions for a range of activities from 'long-term sitting' (for example at open-air cafés), through 'standing' and 'strolling' and finally to 'business walking'. The more sedentary the activity, the lower the acceptable comfort threshold will be. Table 1¹ gives a description of the Lawson comfort criteria and the threshold wind speeds. The use of the Lawson comfort criteria has been shown to represent good standards of environmental practice and is widely accepted by Local Planning Departments. The conditions have also been assessed for safety using the Lawson 'distress criteria' which have been developed for use in assessing the onset of wind-induced

¹ P Blackmore, BRE Digest 520, Wind Microclimate Around Buildings, May 2011

'distress'. These are based on a probability of exceedance of 0.025% of a given threshold windspeed per year, or 0.040% exceedance per month and equate to approximately one exceedance per year or per month. The threshold mean windspeeds used are Beaufort 7 (15m/s) for frail people and cyclists and Beaufort 8 (20m/s) for the general public in areas where frail people or cyclist would not normally be expected.

It should be recognised that the full Lawson comfort assessment can only be carried out with quantitative measurements of pedestrian level mean and gust wind speeds obtained from a wind tunnel study. The wind microclimate assessment carried out in this study uses expert judgement and experience to qualitatively apply the Lawson comfort criteria to the pedestrian microclimate around the development.

Table 2 The Lawson comfort criteria and threshold mean wind speeds

Activity	Lawson comfort criteria	
	Unacceptable	Tolerable
Roads and car parks, business walking, fast walking from A to B	10.7 m/s (B5) > 6%	10.7 m/s (B5) > 2%
People at work, workers around buildings	10.7 m/s (B5) > 2%	7.9 m/s (B4) > 2%
Pedestrian strolling, slow walking with occasional stops, shopping, short-term standing eg at bus stops	7.9 m/s (B4) > 4%	5.4 m/s (B3) > 6%
Long-term sitting – in open-air cafes, parks, etc. for periods of more than about 10 min	5.4 m/s (B3) > 6%	3.3 m/s (B2) > 6%
Entrances and exits of buildings or areas where there is a risk of sudden exposure to wind	5.4 m/s (B3) > 6%	3.3 m/s (B2) > 4%
Covered areas – pedestrian seating areas under cover, places of high cultural significance	5.4 m/s (B3) > 1%	3.3 m/s (B2) > 4%

5 Meteorological Data

Wind records have been obtained from the Met Office from the weather station at Heathrow Airport which will be representative of the wind conditions at the Partridge Way site.

Joint frequency tables of wind speed and direction over a ten-year period are presented in Figure 8 in the form of 'wind roses' for the summer and winter months, and also for the year as a whole. Analysis of these records shows that the prevailing wind direction throughout the year is south westerly which is typical of much of the UK.

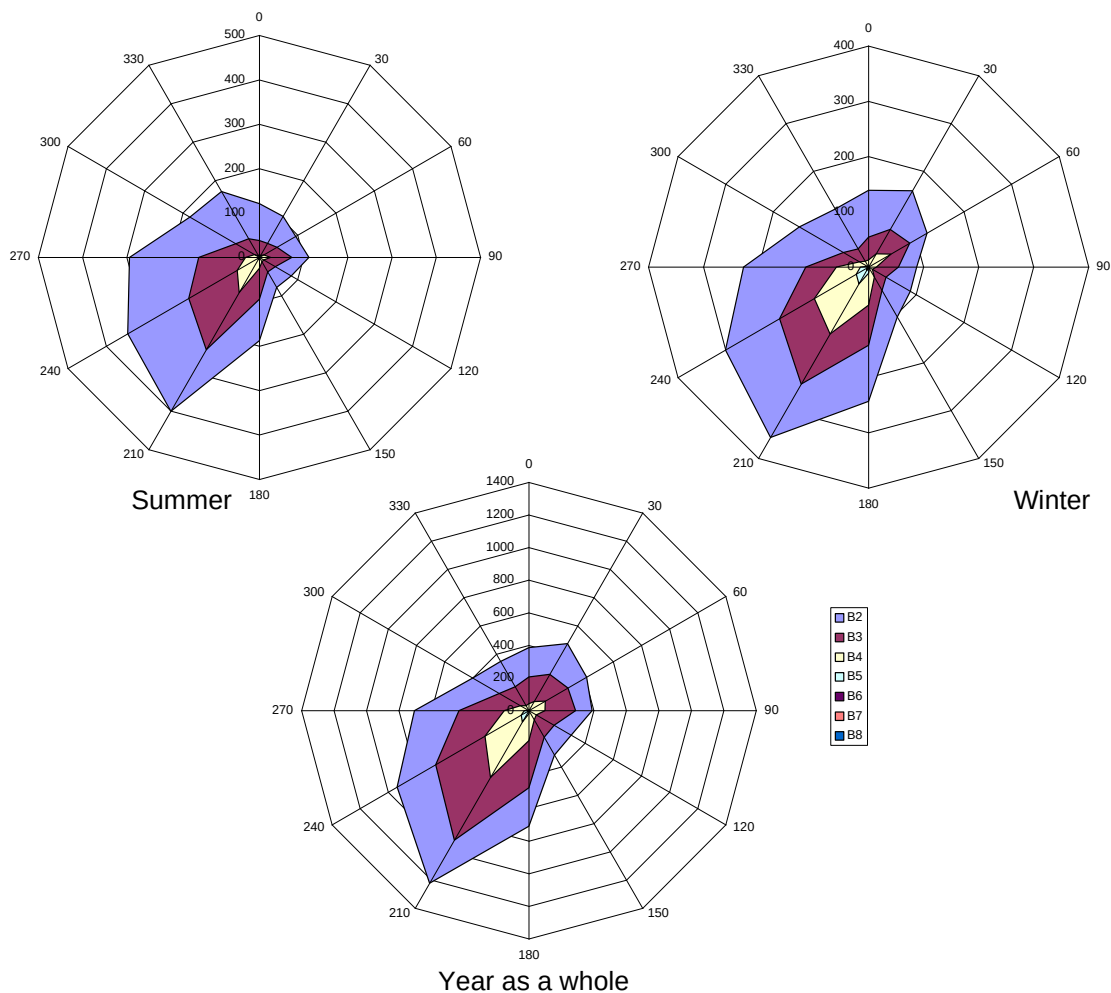


Figure 8 Wind roses for the London area

6 Expected Wind Conditions Around the Proposed Development

6.1 General Behaviour of the Wind

Wind fundamentally consists of the motion of air. It is the amount of air motion and how this motion is perceived that affects how windy a place is judged to be. A property of air is that it has inertia. This means that air does not move unless a force acts upon it. In layman's terms, air can be thought of as being 'lazy' and, given the choice, will always take the easiest path around a building. Understanding this issue is important when desk studies such as this are undertaken. This is because comments about wind conditions around a site can only be based upon a judgement about the likely routes that air will take. These judgements are tempered by experience of similar projects, and by knowledge of potential wind problems that might be encountered.

High-speed winds are usually produced by the passage of large-scale weather systems. These weather systems are created by the convective circulation pattern that results from differential heating of the earth's surface at the poles and the equator. This convective pattern combines with the effects of the earth's rotation to produce prevailing south-westerly winds across much of the UK. Such winds not only come from this direction more often than any other, but they also tend to be the strongest winds that can occur. It is however important to consult wind records from a meteorological station close to the site of any proposed development in order to confirm the local prevailing wind direction before undertaking a desk study such as this. A site's proximity to the coast or topological features, such as mountains or lakes, can mean that winds may blow from alternative directions to the typical south-westerly.

Nearer to the ground, effects of surface roughness associated with buildings, trees and other obstructions influence certain aspects of the behaviour and properties of the wind. The ground level winds experienced by the public are influenced strongly by the geometry of nearby buildings. In general, the nearer the building is to a given location; the more strongly its influence is felt. Thus, although the local pedestrian level wind conditions (both the relative strength and gustiness of the wind and its direction) are influenced by nearby buildings, the frequency of occurrences of such winds, and the mean wind strength itself, are determined by wind conditions far above the earth's surface.

Windward vortices are a phenomenon common to many tall buildings, especially those which rise above their surroundings and provide a significant frontage to the prevailing wind. High-speed winds from higher levels above the ground may be deflected downwards by the windward building façade, this can cause significant nuisance and/or distress to pedestrians in the vicinity. Entrances to buildings are particular areas of concern.

Another potentially problematic pedestrian level wind phenomenon occurs when winds (including perhaps those deflected to ground level by a windward vortex) accelerate around the windward corners of buildings. Such conditions can be particularly uncomfortable for pedestrians passing from a sheltered area with calm wind conditions immediately into a windy location as they step past the corner of an affected building.

Entrance doors are generally wind-sensitive locations because people walking out from a windless conditioned indoor environment to outdoors are immediately confronted with the effects of the wind and can perceive the wind to be stronger than it actually is. For this reason particular attention should be paid to the wind conditions around doorway locations. Entrances located at unprotected corners of buildings where winds tend to 'whip' around from one façade to the next can be particularly problematic.

There is one main entrance to the proposed development plus a fire exit, and secondary entrances to the bin store, to the cycle store and to the plant room. These entrances/exits are shown on Figure 9.

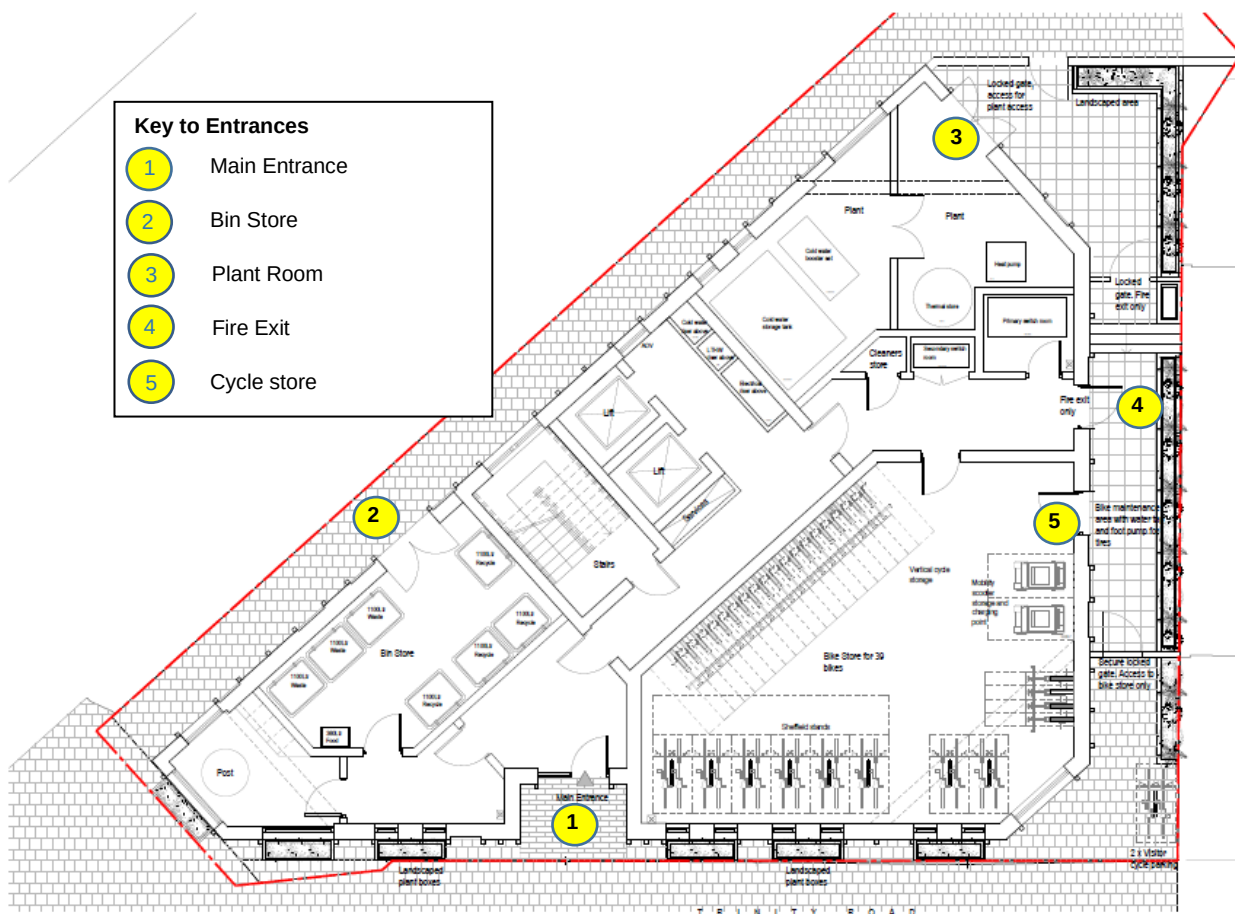


Figure 9 Location of the entrances/exits to the buildings

6.2 Assessment of wind effects and their impact on pedestrian activities

As previously mentioned, the target pedestrian comfort criterion, as defined in Table 2, around the development will be Strolling and Standing on the footpaths and public realm areas and Entrances at the main entrances to the building. The expected wind conditions around the development have been compared with these benchmark criteria.

The following assessments consider wind approaching from the four principle orthogonal directions and from the prevailing south westerly direction.

6.2.1 Northerly wind

To the north of the development are Finsbury House and Newbury House. These 15 storey buildings will provide some shelter from northerly winds, although there is a large gap between these buildings so northerly winds will still blow on to the proposed development. The development presents its largest elevation to the north so there is the potential for northerly winds to generate a windward vortex on this façade. This is likely to generate some downwash on this façade which will increase the wind speeds at ground level. Given the height and massing of the proposed building it is judged that the ground level wind environment will be suitable for pedestrian strolling and standing but unsuitable for main entrances. The only entrance on this elevation is the bin room entrance. There is a boundary wall in front of this entrance which will provide wind shelter. The bin store entrance will not be used by the general public and will not be in constant use. At infrequently used secondary entrances such as this it is normal practice to relax the standard Lawson entrance door criteria from Entrance doors to Strolling. It is therefore expected that the conditions at this location will be suitable for use as a secondary entrance.

Northerly winds blowing on to the north façade will tend to be accelerated around the east and west corners of the building. The building has a triangular plan shape. This will tend to reduce the wind acceleration around the corners compared with the acceleration around a building with square corners. The building also has balconies on the east and west corners which will help to break up and dissipate the wind flow around the corners. There are no entrances near the west corner. The entrance to the bin store on the east corner is protected by a wall at ground level. Therefore, the wind conditions at these corners are judged to be suitable for the intended activities.

Summary:

Northerly winds are likely to be relatively infrequent at this Site and will generally have a lower magnitude than the prevailing south westerly winds, as shown in the wind roses in Figure 8. There is likely to be some downwash on the north façade leading to flow acceleration around the west and east corners. However, the wind conditions around the building are expected to be suitable for the intended pedestrian activities at all locations and there are not expected to be any adverse wind impacts around this development from northerly winds.

6.2.2 Easterly Winds

Immediately to the east of the development is a terrace of two storey houses, further afield the existing buildings are generally two to three storeys high. To the northeast there are two 15 story blocks similar in size to Finsbury House and Newbury House.

The existing terrace of two storey houses immediately to the east will provide significant shelter at ground level. The proposed development will protrude above these two storey houses by seven stories so easterly winds will still blow on to the upper parts of the building. Easterly winds at higher levels will be mainly deflected around the northeast and southeast corners of the building. There is a wall and some planting in the gap between the new development and the existing houses, this and the close proximity of the existing houses means that it is unlikely that the approaching easterly winds will be significantly deflected down to ground level on the east elevation or around the southeast or northeast corners of the building.

The pedestrian access at ground level on the east elevation is primarily to the fire exit, the cycle store and the plant room. These are all secondary entrances or emergency use only fire exit. There is a locked gate securing this area so there will not be any significant or frequent pedestrian access to this area. The wind conditions in this area are expected to be suitable for the intended usage.

Summary:

Easterly winds are relatively infrequent and will be of relatively low magnitude. The adjacent upwind housing will provide significant shelter at ground level from easterly winds. It is expected that easterly winds will be mainly deflected around the proposed building at higher levels and convected downwind and dissipated rather than being deflected down to ground level. It is expected therefore, that the wind conditions around the development for easterly winds will be suitable for the intended pedestrian activities at all ground level locations and there are not expected to be any adverse impacts from easterly winds.

6.2.3 Southerly Winds

To the south of the proposed development there are rows of two storey houses. These buildings will provide a limited amount of shelter at ground level. There are also several mature trees to the south of the development which will contribute to the wind shelter.

The southerly façade is orientated southwesterly so it is unlikely that southerly winds will generate a windward vortex on this façade. Southerly winds blowing on to this façade will be mainly deflected along this façade and will be accelerated around the western end of the building. There are no entrances at the western end of the building. The main pedestrian activity here will be Strolling or Standing; the wind conditions are expected to be suitable for these activities. The main entrance to the building is on the southwest façade and is recessed; which will provide local shelter at this entrance. It is unlikely therefore that southerly winds will adversely impact the main entrance and the wind conditions at this entrance are judged to be suitable for entrances.

Summary:

Southerly winds are not expected to generate any adverse wind impact in public realm areas or at the main entrance to the development. The wind conditions around the development for southerly winds are expected to be suitable for the intended pedestrian activities at all ground level locations

6.2.4 Westerly winds

To the west of the proposed development there are no nearby upwind buildings. The wind will blow over mainly two storey residential developments and several mature trees and then an open area before reaching the proposed development. Consequently, there will be limited shelter to the proposed development from westerly winds.

The building presents its narrowest facade to westerly winds so no windward vortices will be formed. Wind blowing on to the narrow western elevation will be deflected along the northern and southwestern facades of the building and little flow acceleration is expected. The wind conditions along the northern and southwestern facades are expected to be suitable for Strolling and Standing. The main entrance on the southwest façade is recessed so the conditions here will be suitable for entrances. The bin room entrance is on the northern façade. There is internal access to the bin store for residents of the development, so the external entrance will only be accessed intermittently during bin collections. This is a secondary entrance and the wind conditions here are expected to be suitable for secondary entrance use.

Summary:

Westerly winds are not the strongest or most frequent, but they will still occur for a significant period of time. However the building presents its narrowest façade to westerly winds so little flow acceleration around the building will be generated and the wind conditions in public realm areas and at the entrances are judged to be suitable for the intended pedestrian activities.

6.2.5 Southwesterly winds

The prevailing wind direction at this site is southwesterly, see Figure 8. The strongest and most frequent winds will blow from this direction.

To the southwest of the proposed development there are rows of two storey houses and several mature trees. These will provide a limited amount of shelter at ground level.

The southwest façade of the proposed development faces the prevailing wind. There is likely to be a windward vortex generated on the southwest façade. This will create downwash which is likely to increase the wind speeds at ground level in front of the building and around the west and east corners of the building. However, given that the building is only nine stories tall and relatively narrow, the windward vortex is unlikely to be particularly strong. There are several landscaped plant boxes along the southwest façade of the building to the east and west of the main entrance (these are shown on Figure 9). These planters will provide shelter and help to dissipate ground level wind flow along this facade. They will also prevent pedestrian access along the southwest façade of the building. The wind conditions in the pedestrian areas in front of the building are therefore expected to be suitable for Strolling and Standing.

Some of the downwash on the southwestern façade will be accelerated around the western corner of the building. This effect will be ameliorated by the landscaped planters and by the balconies on the western corner of the building so the conditions at this corner are expected to be suitable for Strolling. At the south eastern corner of the buildings there is a narrow landscaped passageway leading to the cycle store and fire exit. This passageway has a gate and at the far end there is a solid wall. This passageway is also relatively narrow. These factors combined with the planters on the southwest façade will together ameliorate the wind flow and create flow resistance so it is unlikely that there will be significant ground level wind flow around the eastern corner of the building and through this passageway.

The main entrance to the building is on the southwest façade. Therefore southwesterly winds will blow more-or-less directly on to this entrance. However, this entrance is well recessed so will be protected from the effects of downwash and the form of the building is not expected to accelerate southwesterly winds on to this entrance. The landscaped planters will also provide some shelter to the main entrance. It

is therefore not expected that there will be any significant adverse wind conditions at this entrance from southwesterly winds and the conditions here are expected to be suitable for Entrances.

Summary:

Southwesterly winds are the most frequent and the strongest at this site and a weak windward vortex is expected to be formed on the southwesterly façade. However, the form of the building and the recessed main entrance on this façade means that the wind conditions along this façade and at the main entrance are expected to be suitable for the intended pedestrian activities at all locations.

7 Conclusions

It is proposed to develop a site on Partridge Way in the London Borough of Haringey to create a new nine storey residential building and to landscape an adjoining triangular area to the northeast of the building. The Application Site for the building is currently occupied by single storey residential garages and a paved area. The proposed landscaped area is not part of this wind microclimate assessment.

The site is bounded to the north by Partridge Way, to the southwest by Trinity Road and to the east by existing two storey housing.

BRE have been appointed by Haringey Council to undertake a desk study to consider the pedestrian level wind effects around the proposed building.

This study is based upon information provided to BRE by the Client via email which included images and drawings of the proposed building and surrounding area.

The conclusions of this desk study are as follows:

- The wind conditions around the proposed new building on Partridge Way are expected to be suitable for the pedestrian activities of Strolling or Standing in all public realm areas around the development.
- The wind conditions at the main building entrance and at the fire exit and secondary entrances are expected to be suitable for Entrance/Exit use at these locations.
- The proposed development is not expected to generate any adverse wind conditions in the wider existing area or around existing buildings.
- It is expected that the wind microclimate around the proposed Partridge Way development will be suitable for the intended pedestrian activities at all ground level locations on footpaths, public realm areas and adjoining areas. There are not expected to be any adverse impacts on the wind microclimate.