



St Ann's Hospital Haringey

Desktop Wind Microclimate Assessment

For Peabody Trust, Catalyst by Design and Hill Residential

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St Ann's New Neighbourhood

This Desktop Wind Microclimate Assessment has been prepared by Hydrock Consultants Ltd as part of the planning application for Phase 1b and 2 for Peabody Trust, Hill Residential Limited, Catalyst Housing Limited and Catalyst by Design Limited for the proposed development at St Ann's New Neighbourhood.

This report is required to satisfy the RMA submission requirements set out in Annex 1 of the approved hybrid consent.

1. Introduction

1.1 Purpose of Report

The purpose of this report is to provide the planning department at London Borough of Haringey Council with a desktop assessment of potential wind microclimate effects in relation to pedestrian comfort caused by the new development. This desktop assessment will highlight any risk areas and potential mitigation measures based on industry guidelines.

The methodology followed within this report is in line with the methodology agreed within the Hybrid application, this covers the below.

The desktop assessment has been carried out in accordance with the guidelines and recommendations contained in BRE Digest (DG) 520, Wind Microclimate Around Buildings (BRE, 2011).

The following has been undertaken:

- » Suitable microclimate weather conditions have been determined based on historic weather data;
- » The impact of the proposed development massing on the local wind environment has been determined;
- » Potential risk areas for assessment have been highlighted (where applicable);
- » Occupant and pedestrian comfort conditions have been reviewed in accordance with BRE guidelines;
- » The anticipated wind environment has been assessed using Lawson Comfort Criteria; and
- » Potential mitigation strategies for any building related discomfort conditions (where necessary) have been explored.

1.2 Site Context

The Site is situated to the south of St Ann's Road, 1.5 km to the south west of Seven Sisters Station (Zone 3), 1.9 km to the west of South Tottenham Station (Zone 3), 1.3 km to the east of Haringay Green Lanes Station (Zone 3) and 1.7 km to east of Haringay Station (Zone 3). The Site is located adjacent to a bus stop providing services to Wood Green and Kingsland and 160m from a bus

stop providing services to Edmonton and Waterloo.

The site is bounded to the south by the Overground railway line and the rear gardens of properties in Warwick Gardens to the west. The site is bounded to the east by the refurbished St Ann's Hospital site, the hospital buildings range from 2-3 storeys and vary in style, including a new build elements and refurbished post war buildings. The remainder of the local area is predominantly residential in character with buildings of varying styles and age. There are more recent flatted blocks abutting the north-east corner of the site, which range in height from four to seven storeys.

1.3 Development Details

Application for the approval of reserved matters respect of appearance, landscaping, layout and scale relating to Phases 1b and 2 associated with the outline component of planning permission HGY/2022/1833 for Outline planning permission (with all matters reserved except for access) for Phases 1B, 2

and 3, for: (a) the erection of new buildings for residential development (Use Class C3) and a flexible range of non-residential uses within Use Class E, F1/F2; (b) provision of associated pedestrian and cycle accesses; (c) landscaping including enhancements to the St Ann's Hospital Wood and Tottenham Railsides Site of Importance for Nature Conservation (SINC); and, (d) car and cycle parking spaces and servicing spaces.



Figure 1 - Landscape GA site plan of Phase 1b and 2 of the St Annes Hospital development

Planning Policy and Guidance

This section of the report details the planning policy and accepted industry guidance in relation to wind and microclimate that is of relevance to the St Ann's Hospital Haringey development.

2. Planning Policy

2.1 National Planning Policy

There are no current national planning policies in relation to wind and microclimate in new developments.

2.2 Local Planning Policy

2.2.1 The London Plan 2021

Policy D8 - Public Realm

This policy states that new development proposals should ensure that appropriate shade, shelter, seating and, where possible, areas of direct sunlight are provided, with other microclimatic considerations, including temperature and wind, taken into account in order to encourage people to spend time in a place.

2.3 Guidance

There are a number of guidance documents that can be used to assess wind microclimate in the urban environment. These include:

- » BRE Digest (DG) 520, Wind Microclimate Around Buildings (BRE, 2011);
- » City of London Wind Microclimate Guidelines.

There are a number of recommendations that would ensure a good starting point for assessments. This recommended assessment methods are shown in Table 1.

The City of London guidelines have been developed for city centre locations and may not be wholly appropriate for suburban locations. However, these are a good starting point for assessments. This recommends the following assessments methods are utilised:

Building Height	Recommended Approach to Wind Microclimate Studies
Similar or lower than average height of surrounding buildings Up to 25m for CoL	Wind studies are not required, unless sensitive activities are intended (e.g. around hospitals, transport hubs etc) or the project is located on an exposed location (e.g. edge of Thames, near a tall building).
Up to double the average height of surrounding buildings 25m to 50m for CoL	Computational (CFD) simulations OR wind tunnel testing
Up to 4 times the average height of surrounding buildings 50m to 100m for CoL	Computational (CFD) simulations AND wind tunnel testing
High-Rise Above 100m	Early-stage massing optimisation: Wind tunnel testing OR CFD Detailed design: Wind tunnel testing AND CFD

Table 1: Recommendations for microclimate studies

Wind Conditions and Pedestrian Comfort

A preliminary assessment has been carried out in line with the guidelines and recommendations in BRE DG 520. Wind conditions in the built environment can impact upon the comfort and wellbeing of site occupants.

Whilst there are no all-encompassing criteria that can be used to assess pedestrian comfort, the most widely accepted criteria in the UK is the Lawson Comfort Criteria.

3. Lawson Comfort Criteria

The Lawson Comfort Criteria are a well-established benchmark assessment that is used to assess the suitability of wind conditions in the urban environment based on a number of threshold values of wind speed and frequency defined against a range of pedestrian activities.

If the wind conditions at the site exceed the threshold value, then the conditions can be considered unacceptable for the designated activity.

The Lawson Comfort Criteria and associated Beaufort Force (measure of wind speed and conditions) are shown in the following tables. The tables can be used to assess whether or

not wind speed will have a negative impact. For example, if the wind speed exceeds Beaufort Force 3 (B3) for more than 1% of the time, it will be unsuitable for sitting out for long periods.

Table 2: Lawson comfort criteria

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

Table 3: Beaufort scale of wind speeds

Beaufort Force	Hourly Average Wind Speed (m/s)	Description of Wind	Noticeable Wind Effect
B0	<0.45	Calm	Smoke rises vertically
B1	0.45 - 1.55	Light air	Direction shown by smoke drift but not by vanes
B2	1.55 - 3.35	Light breeze	Wind felt on face, leaves rustle, wind vane moves
B3	3.35 - 5.60	Gentle breeze	Leaves and twigs in motion, wind extends a flag
B4	5.60 - 8.25	Moderate breeze	Raises dust and loose paper, small branches move
B5	8.25 - 10.95	Fresh breeze	Small trees in leaf sway
B6	10.95 - 14.10	Strong breeze	Large branches begin to move, telephone wires whistle
B7	14.10 - 17.20	Near gale	Whole trees in motion
B8	17.20 - 20.80	Gale	Twigs break off, personal progress impeded
B9	20.80 - 24.35	Strong gale	Slight structural damage, chimney pots removed

Baseline Wind Conditions

Baseline wind conditions have been determined using historical wind data for London. The closest available dataset is Hampstead Weather Station, London. This includes annual data for wind speeds and directionality.

4. Wind Data Analysis

The closest meteorological weather data station to the site, that holds historical wind data is RAF Northolt, Ruislip, London. The weather station is 20 miles from the site. This site has been chosen because it holds historical weather data from 1973 - May 2023.

4.1 Prevailing Winds and Seasonal Variations

The seasonal variation in wind speeds is shown in Figure 3. Wind speeds are generally much lower during the summer months, with the majority of high wind speeds occurring in the autumn, winter and spring.

The prevailing wind direction for the Haringey area is south westerly. The direction and intensity of the wind can vary throughout the year, however the predominant wind direction in south westerly. Figure 2 provides a wind rose to show the variation in wind direction from 1973 to present.

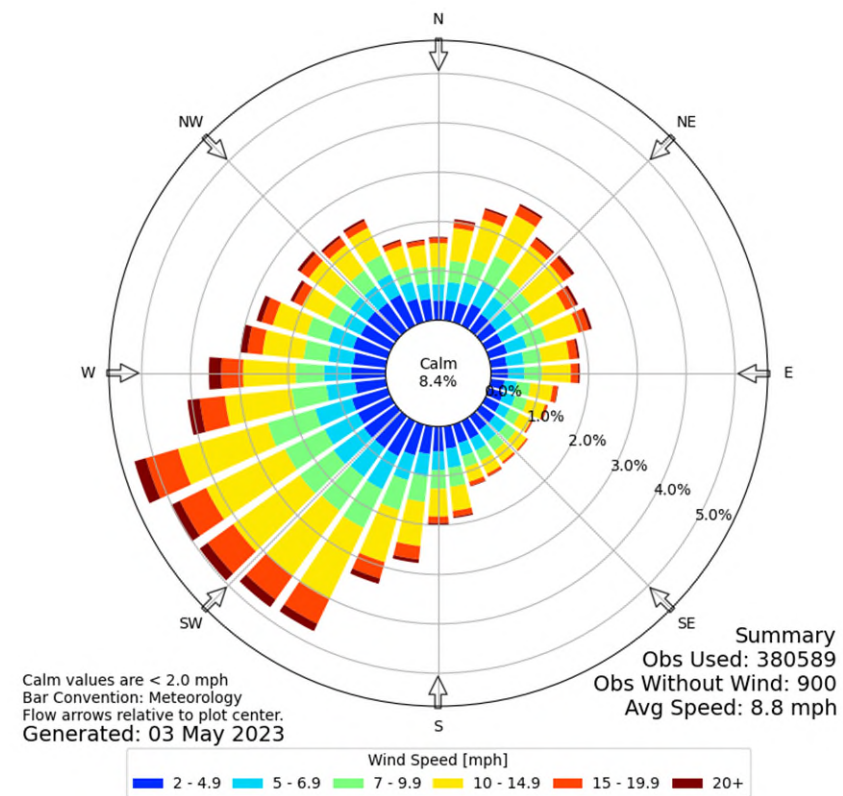


Figure 2 - Wind rose for Northolt weather station, data from 1973 - present.

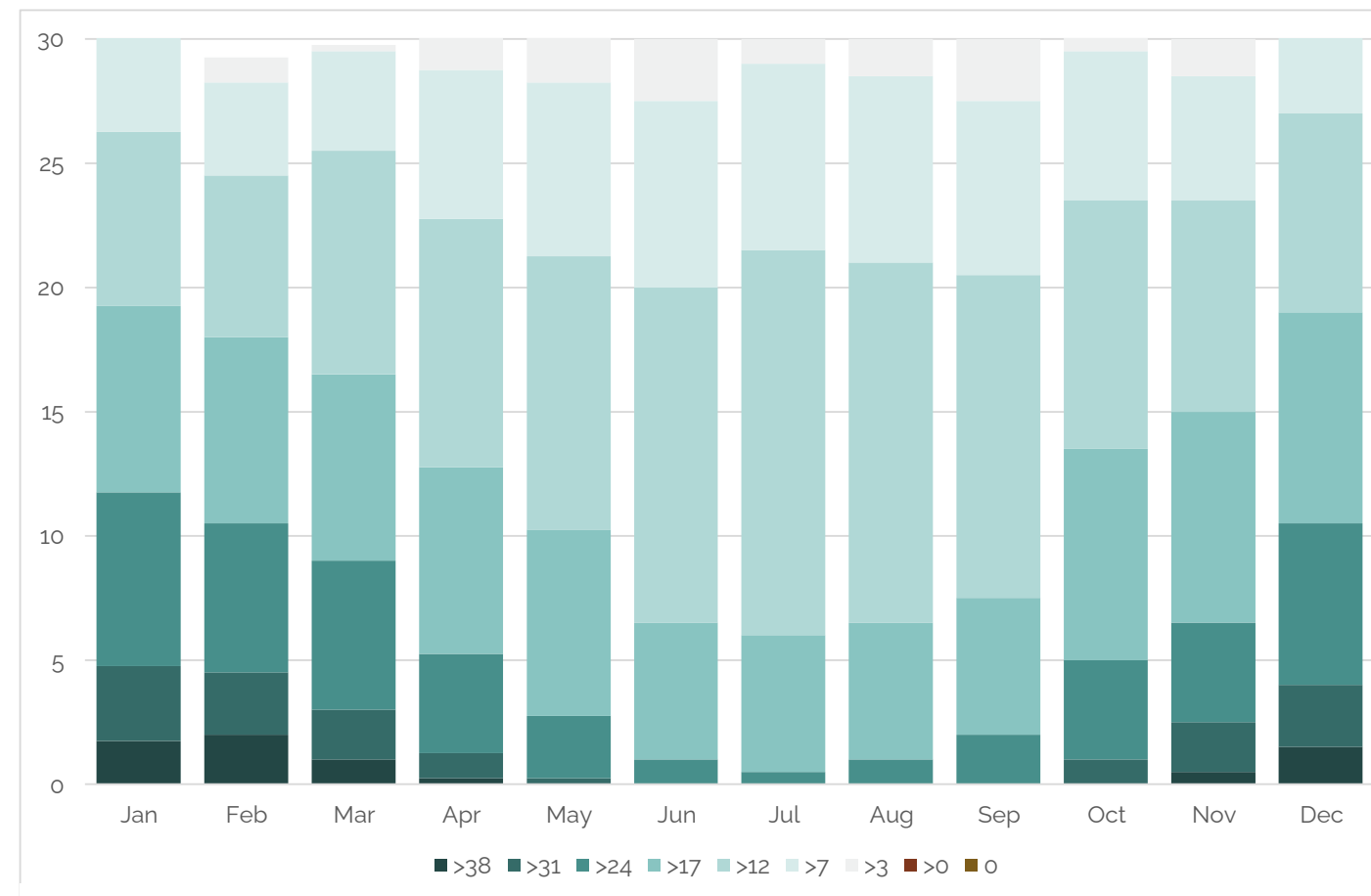


Figure 3 - Wind speed data showing the average number of days per month wind speeds exceed the threshold.

Typical Wind - Building Interactions

The wind flow around buildings can have a major impact on pedestrian comfort and safety. A pleasant and safe pedestrian wind environment is a crucial requirement of good building design and urban planning. The pedestrian level wind environment is governed by the layout and massing of buildings.

This section of the report will discuss the potential wind effects caused by buildings and the likelihood of this occurring at the St Ann's Hospital Haringey development.

5. Site Layout and Wind Effects

5.1 Terrain

Terrain has a strong influence on local wind speed. The St Anns New Neighbourhood development is set within an urban site and will experience lower mean wind speeds than open country. However, the amount of turbulence will be increased due to the roughness of the terrain when compared to open countryside.

The historic weather data for the site has been taken from RAF Northolt weather station, so the average wind speeds in the vicinity of the development can be expected to be in line with these figures.

There are hospital buildings on the east side of the site, in close proximity to the development while the rest of the site is surrounded by mixed-use residential and retail buildings. It is believed the proposed development at St. Ann's will result in minimal changes in terrain. The proposal takes a measured approach to height across the site and the design justification for this is set out in more detail in the Design and Access Statement.

The proposal takes a measured approach to height across the site and the design and is in line with the future surrounding buildings in terms of building use, size and construction. No major wind issues are likely to be caused by a change in terrain caused by the development.

5.2 Passageways

Where passageways or tunnels pass beneath a building at ground level, wind problems can occur frequently due to the tunnel providing a direct path from the positive pressure on the windward building face to the low-pressure region in the wake. These features are often best avoided for pedestrian use and tend to only be suitable for vehicular access.

There are no covered passageways proposed as part of the development.

5.3 Funnelling

Wind funnelling and flow acceleration can occur where there are gaps between buildings. The effect is stronger where the axes of the buildings make an angle of 90° or less.

There are no instances on the site where buildings are designed to sit at angles of less than 90°.



Figure 4 - Phase 1b and 2 storey heights plan

6. Building Height and Form

6.1 Building Height

Wind speed increases with height above ground, however, not all tall buildings cause wind problems, what is important is the relative height of the building compared with that of neighbouring buildings.

The illustrative design proposals include main four plots with differing storey heights from 5 - 9 storeys.

To assess the likelihood of the impact of building height on pedestrian wind effects, a desktop check in line with BRE guidelines has been carried out. The BRE recommend that for there to be a minimal impact on pedestrian wind environment the proposed buildings should be within less than 2.5 x average height of the surrounding buildings. This initial check indicates that the surrounding buildings are within the recommended height differential to the proposed development.

As it currently stands, the proposed development will be less than 2.5 x the average height of the surrounding buildings.

6.2 Building Form

In general, tall rectangular, sharp-edged buildings will generate the highest local ground-level wind speeds and the largest 'footprint' area of unpleasant wind speeds.

Where such buildings are unavoidable, they should be orientated so that their long axis is aligned with the prevailing wind direction in order to minimise their impact on the surrounding area.

The proposed development has long axes facing the west and south. As the prevailing wind direction is southwesterly the site will likely experience higher wind speed conditions due to its orientation. However, as the wider development is built out to the north of the site, this will offer some protection from the wind and break up the flow from the west direction.

The extent of the wind footprint depends on the building dimensions. Circular or multi-

faceted buildings will provide a more aerodynamic profile to the wind, these tend to cause less downwash because more air is spilled around the sides. As the site is multi-faceted, this should provide protection to pedestrians around the site and reduce any wind effects.

Irregularities on the façade, such as balconies and fenestrations, will reduce the risk of downwash and any associated comfort issues at ground level. It is recommended these are considered to improve overall wind comfort at pedestrian level.

6.2.1 Effects of building form

- » **Down-washing** of the wind occurs when a building is taller than its surrounding buildings. The taller scheme forces high level winds to ground level where they create locally high wind speeds in the pedestrian realm.
- » **Corner acceleration** around building corners may occur due to the difference in pressure on the upwind and downwind façades (low pressure zones on the leeward side and zones of higher pressure on the windward side of the building). This effect is particularly pronounced around sharp corners which create localised windy areas in the vicinity of the corner where the flow is accelerated around the building.
- » **Channelling** between buildings in close proximity to each other, particularly where the area between is aligned with the prevailing wind direction, "squeezes" the wind through a smaller area resulting in wind acceleration.

6.3 Downwash

When the wind strikes the front face of a building, it will produce positive pressures that reaches maximum value at a point between about $\frac{2}{3}$ and $\frac{3}{4}$ of the building height. Below this height, the wind will tend to be deflected down the front face towards the ground, often called downwash, and accelerated around the corners at ground level producing areas of high wind speed and strong negative pressure. Above this height, the wind will be deflected upwards and

accelerated over the roof, causing areas of high wind speed and increased turbulence.

The BRE recommends the presence of "oversized" canopies with projection distances between 3m and 5m. It recommended that irregularities in the building faces are designed to these dimensions, to provide a significant degree of shelter for protection against downwash.

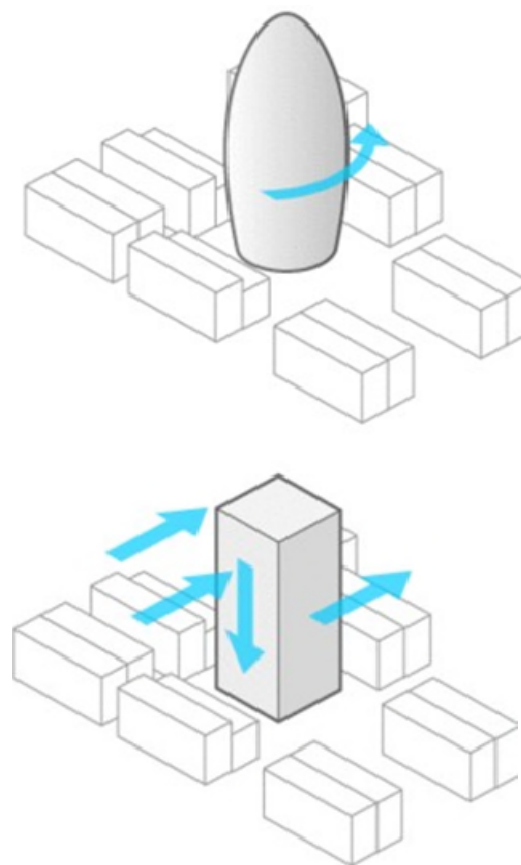


Figure 5 - Effect of building shape on wind turbulence and downwash

6.4 Wake

This is where the wind flows around the building will recombine into a region of negative pressure known as the 'wake'.

This will persist for between about six and ten times the building height before the original flow patterns are re-established. The larger the building, the larger the volume of air that must be displaced, and the larger the potential ground-level wind speeds.

Tall, isolated slab-sided buildings adjacent to large open spaces and wide streets will tend

to produce high wind speeds at pedestrian level, whereas similar-height buildings separated by narrow streets will tend to give rise to fairly sheltered conditions at ground level.

During instances of high wind conditions that are perpendicular to the building, tree planting scheme or gantries to provide protection around the site, will improve wind comfort at ground level and to provide shelter when these wind conditions arise.

By the time the proposed development is built out, the surrounding massing will represent a developed area, so there is little potential for transverse wake flow. The effect is generally more pronounced where buildings are located in an isolated rural environment or where there is a significant height differential to surrounding buildings. So, the effect is anticipated to be minimal.

6.5 Street Canyons and Geometry

The importance of wind comfort in street canyons is more pronounced in city centres with buildings of irregular heights interspersed with high-rise buildings. As this development is urban, the requirement to maintain a safe and pleasant wind environment are critical because of the increased potential for increased wind speeds.

The optimum height-to-width (h/w) ratio for ideal wind comfort is approximately 1.7.

As h/w increases, the pedestrian-level wind speeds are likely to reduce but this can have a detrimental effect on other environmental factors such as pollution and heat build-up, which increase as streets become narrower.

The height to width ratio for the illustrative development has a h/w ratio of 1.7 which means that there is unlikely to be a detrimental effect on wind comfort for the development, according to BRE specifications.

The pedestrian wind environment is likely to be comfortable.

Receptor Analysis

In order to identify any potential negative effects in the wind microclimate surrounding the St Ann's Hospital Haringey site, the development and its surrounding structures must be analysed.

By looking at the building form, layout and massing of surrounding buildings, site wind conditions can be anticipated.

7. Potential Receptors

Four potential receptors have been identified for the illustrative development. These relate to potential risk areas for elevated wind speed or building massing wind effects, which include:

- » Roads – to determine if there are potential issues for pedestrian comfort, if used for walking or standing (A);
- » Pedestrian concourse and footpaths – to determine if areas are comfortable for walking or standing (B);
- » Entrances to the building – to determine if there is potential for pressure related issues for entrances and lobbies (C);
- » Outdoor space and terraces – to determine if areas are comfortable for walking or sitting (D).

The proposed development creates a new building massing on the site in an urban area surrounded by commercial and residential buildings.

8. Potential Development Conditions

8.1 Roads (A)

The areas highlighted as roads should be free from most pedestrian traffic, providing mainly vehicle access. Therefore, these areas will not have a significant effect on pedestrian comfort.

In some cases, the increase in downwash caused by tall buildings and subsequent high wind speeds can have the power to overturn HGV lorries which can cause risk to human life. This is not deemed a risk for Phase 1b and 2 of the St Anns Hospital site due to the site being in keeping with the proposed massing of the wider neighbourhood.

8.2 Pedestrian Concourses and Footpaths (B)

The main pedestrian concourses are broken up with street furniture, tree planting and low level foliage. This will help to break up the flow of wind in these areas which will reduce any effects from the prevailing southwesterly winds. There are no anticipated negative wind effects in the pedestrian concourses.

8.3 Building Entrances (C)

There are multiple building entrances across the site.

The wind environment at the proposed entrances within the apartment blocks is anticipated to generally be suitable and within the Lawson Comfort Criteria for entrances, however, during particularly high wind speeds there may be some areas of exceedance. As the prevailing wind direction is from the southwest, most entrances should not be affected, therefore these occurrences are anticipated to be irregular and within the limits of acceptability.

If pedestrian comfort is compromised, the implementation of draught lobbies at the



Figure 6 - Site receptors

proposed entrances could help reduce pressure and wind effects between the internal and external environment, as well as reducing heat loss in winter conditions. Additionally, screens incorporating planters could be placed around entrances in the event they are found to be susceptible to the prevailing winds.

Overall, wind conditions at building entrances are deemed to be acceptable.

8.4 Outdoor Space and Terraces (D)

There are a number of common and public amenity spaces within the development. It is anticipated that these will be within the Lawson Comfort Criteria class for walking.

All public amenity spaces are provided with significant landscaping including a number of mature trees. This will provide shelter and disrupt wind flow.

The courtyard type amenity spaces within the apartment blocks to the south of the site are well sheltered and should not experience negative wind environment.

9. Impact of Landscaping Strategy

The proposed scheme includes a developed landscape strategy. The arrangement of planting, alongside hard and soft landscaping will break up the flow of wind and provide shelter during storm events. The communal garden areas have been designed with significant tree cover including a number of mature trees.

A mix of evergreen and deciduous trees will provide coverage and wind shelter throughout the year, this is particularly important in the winter months when wind speeds are stronger and storm events more frequent.

There is a small risk of increased wind speeds between Block G2 and J1, however, the proposed planting strategy will disrupt these flows and provide shelter if needed. The planting strategy for the Forest Garden is shown in Figure 6.



Figure 7 - Landscape plan for the development

Summary and Recommendations

A qualitative review of potential building related wind effects has been undertaken for the illustrative scheme at St Ann's Hospital Haringey.

10. Conclusion

This report has provided an overview of the current wind conditions at the site, analysis of prevailing wind directions and commentary on seasonal fluctuations in the wind climate.

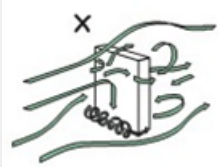
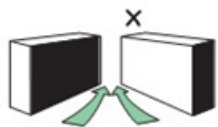
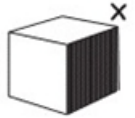
The proposed development is unlikely to cause any major building related wind microclimate impacts. Furthermore, the future designs will aim to maintain similar design features and follow the design guidance outlined in BRE Digest (DG) 520, ensuring wind microclimate impacts are not heightened. Due to this desktop review providing qualitative rather than quantitative assessment, any subsequent conclusions reflect the use of professional judgement only to assess the suitability of the site in terms of pedestrian comfort.

The following areas have been highlighted as areas of potential risk in terms of wind microclimate, however, due to the layout of the site, mitigation measures have already been incorporated to combat the effects of pedestrian discomfort:

- » Potential downwash on south-west facing facades during prevailing winds. Balconies and articulation on these facades will break up the flow of air and provide shelter at ground level;
- » Balcony type and balustrades to be designed carefully to provide protection from prevailing winds; and
- » Building entrances will be sheltered by street tree planting and balconies above.

This initial report has provided an overview of the current wind conditions at the site, analysis of prevailing wind directions and commentary on seasonal fluctuations in the wind climate.

Table 4: Wind microclimate design guidance

Design Guidance		Commentary
Avoid large flanking walls facing the prevailing wind		The site layout means there is flanking walls in four directions. Although the prevailing wind direction is southwesterly and some downwash can be expected on the west facing flanking wall, most adverse wind conditions will be mitigated by the building's design. The irregularity of the building shape and the use of planting in front of the buildings will provide sheltering from downwash forces.
Orientate the long axis parallel to the prevailing winds		The west facing walking wall will likely cause some impact to ground conditions. The site includes significant hard and soft landscaping which will provide sufficient mitigation.
Avoid funnel like gaps between buildings		Funnelling is unlikely to occur at the development, or between the development and existing buildings. Wind speeds are relatively low and the distance between the surrounding buildings is large enough to have that there should be minimal impact.
Avoid large cubical buildings with plain façades		The proposed development has no cubical buildings.
Avoid passageways beneath buildings at ground level		No passageways beneath buildings are included within the scheme.
Group buildings together to minimise height differential		The site is already in an urban area, however, a lot of new developments are emerging nearby to the proposed development with similar heights to the proposed.