APPENDIX 1.3: WIND MICRO-CLIMATE ASSESSMENT

Ham Close Regeneration

Planning Application:

Wind Micro-climate Assessment

Author: WSP

April 2022

Hill Residential

HAM CLOSE, LONDON BOROUGH OF RICHMOND UPON THAMES

Wind Microclimate Assessment

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CONTENTS

1 INTRODUCTION

1.1.1. This Wind Microclimate Assessment Report has been prepared by WSP to support the planning application of the Proposed Development. The report presents the results and recommendations from the study.

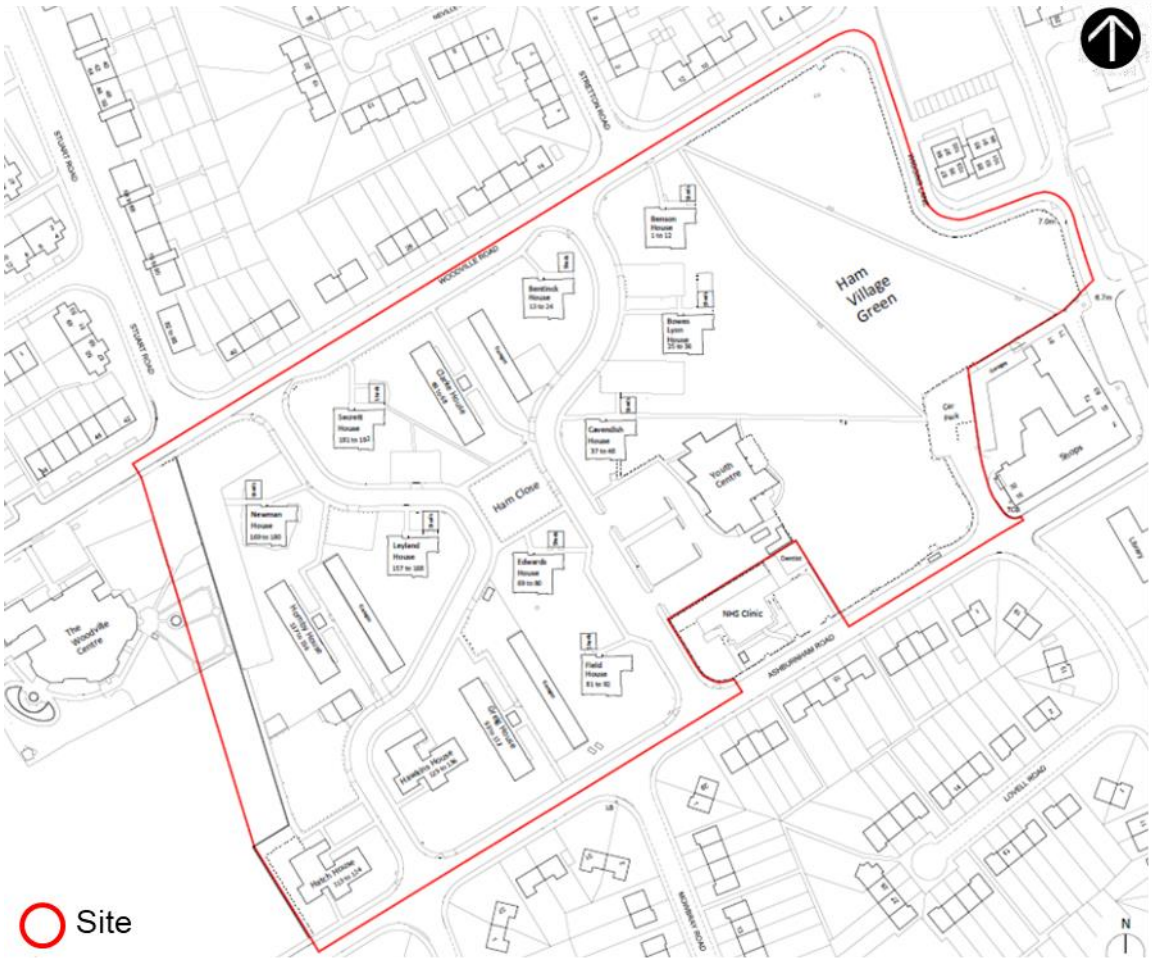
1.1.2. The Proposed Development consists of the Demolition of existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to 3 storeys in height, a “Maker Labs” (sui generis) of up to 2 storeys together with basement car parking and site wide landscaping. (Figure 1-1).

1.1.3. General Site description

1.1.4. Ham Close is a 4.69 ha site located in the suburban district of Ham in London Borough of Richmond Upon Thames (LBRuT), south-west London.

1.1.5. The surrounding area is mainly characterised by residential uses and also by services and facilities uses including retail, education and civic uses.

Figure 1-1 – Ham Close Site Location



2 METHODOLOGY

2.1 ASSESSMENT METHODOLOGY

2.1.1. The assessment has been based on a qualitative analysis of the site and the likely effects of the Proposed Development on the local wind environment. The desktop assessment includes a review of the design proposals, the site context and surroundings. The analysis is based on the drawings and 3D model (Ref: “HCR-BPTW-S01-ZZ-M3-A-001-P06-S1”) provided by BPTW Architects on 22nd February 2022, available satellite views of the Site and its surroundings and WSP’s experience in the field of wind engineering, having carried out a number of numerical assessments both via boundary layer wind tunnel and Computational analysis of numerous projects across the UK.

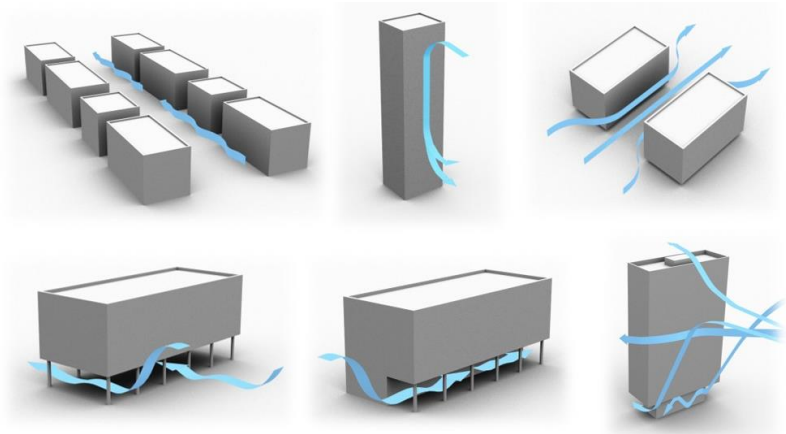
2.1.2. The potential wind effects of the Proposed Development on the local microclimate are discussed with reference to best practice guidelines for pedestrian comfort and safety (Lawson Criteria) and based upon analysis of meteorological conditions for London Heathrow Airport, being the closest meteorological station, and adjusted to the Site. Where appropriate, the report also identifies potential areas of wind acceleration where mitigation measures might be recommended to prevent, minimise or control likely adverse effects arising from the Proposed Development.

2.2 GENERIC WIND EFFECTS

2.2.1. The wind microclimate around an urban environment is affected by terrain, buildings, and other obstructions. Generic wind flows around typical building shapes are well understood and the introduction of a new development can affect the local wind flow patterns, and the assessment of these effects are important during design and planning of buildings.

2.2.2. This is particularly important for buildings which are taller than their surroundings. Fast-moving high-level winds can downdraught to street level along the windward faces of buildings. As air moves into the low-pressure wake of the building, the leeward side, it can accelerate around corners and/or through constrictions, causing localised regions of relatively high wind speed. While it is not always practical to design out all the risks associated with the wind environment, it is possible to provide local mitigation to minimise risk or discomfort where required.

Figure 2-1 – Wind Effects Around Buildings

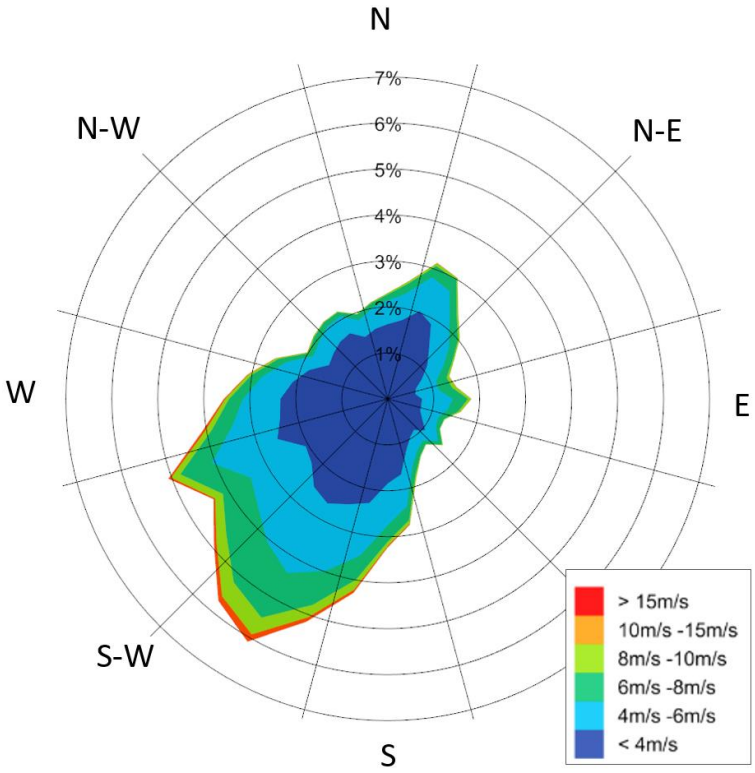


2.3 WIND CLIMATE ANALYSIS

2.3.1. Wind data records from Heathrow Airport Met Weather Station, have been used to inform the qualitative assessment of the local wind conditions surrounding the Site. This is the most reliable meteorological station closest to the Site. The data was discretised into 36 bins, representing 10° sectors. The nomenclature adopted in this report assigns 0° to winds coming from north and increases clockwise such that 90° refers to winds blowing from east, 180° from south and 270° from west.

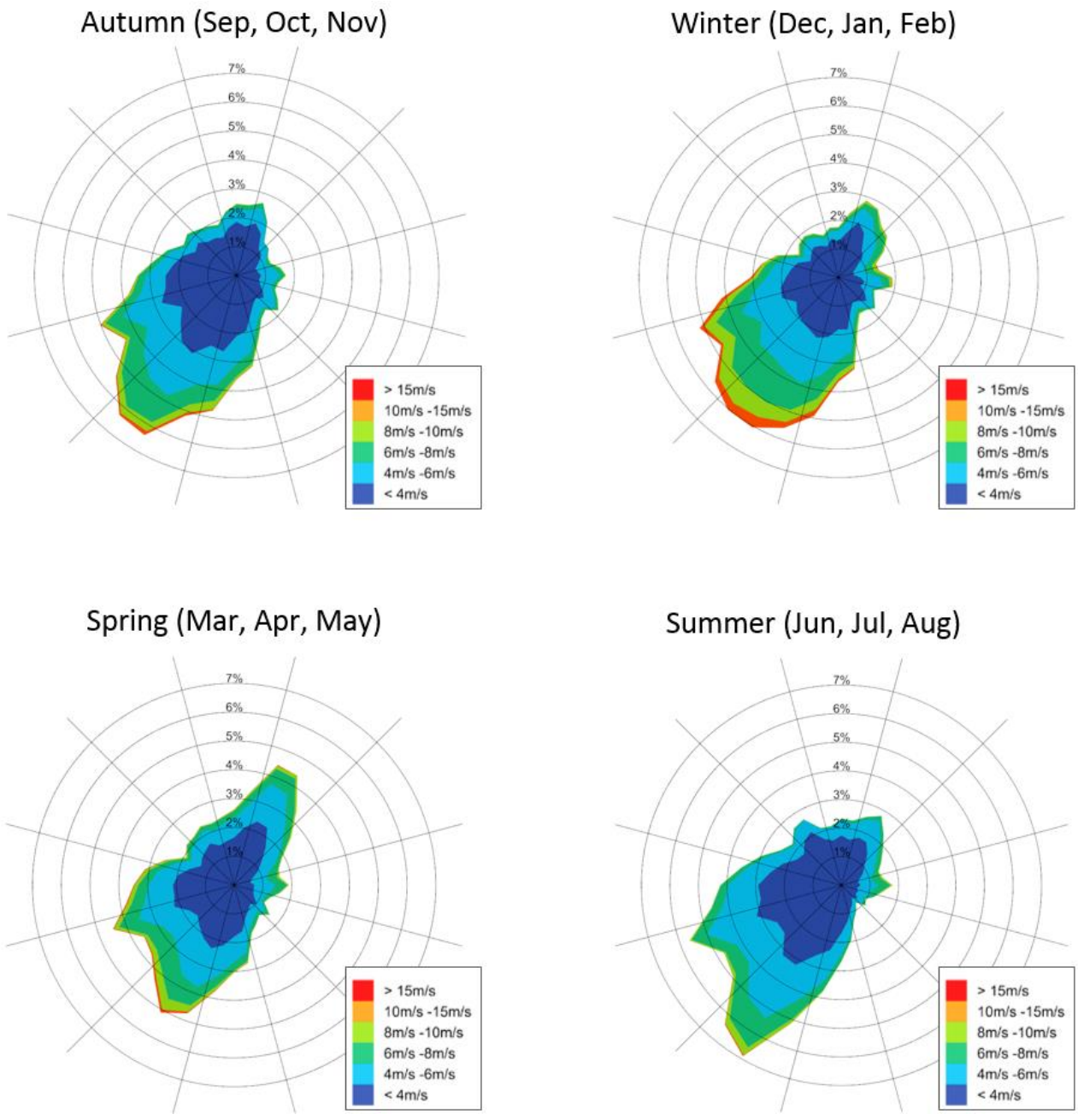
2.3.2. Figure 2-2 shows a summary of the wind data for Heathrow Airport for the whole year in the form of a wind rose. Wind direction is shown on the angular axes, with percentage of hours on the radial axes. For this region, the most frequent wind directions are the south-southwest and close to west quadrant blowing with the highest frequency and representing the largest proportion of higher wind speeds. Wind speeds from the north and north-east quadrant can reach 8-10m/s however, they are relatively infrequent.

Figure 2-2 - Annual Wind Rose for the Met Station



2.3.3. Figure 2-3 shows similar wind roses split into four-month seasons. It shows some variation in directionality, with spring showing an increase in north-easterly winds. The winter months are windier than other months, which is heavily weighted to the southerly winds.

Figure 2-3 - Wind Roses for each season



2.3.4. Figure 2-4 shows the upwind and topographical features surrounding the site and Table 2-1 shows the transposition factors resulted from the terrain analysis. The transposition factors are calculated to account for the differences in terrain surrounding the meteorological weather station and the site, following the wind model proposed by ESDU, an engineering advisory organisation based in the UK (ESDU 2010) (Ref 2).

Figure 2-4 – Categorisation of the terrain surrounding the site.

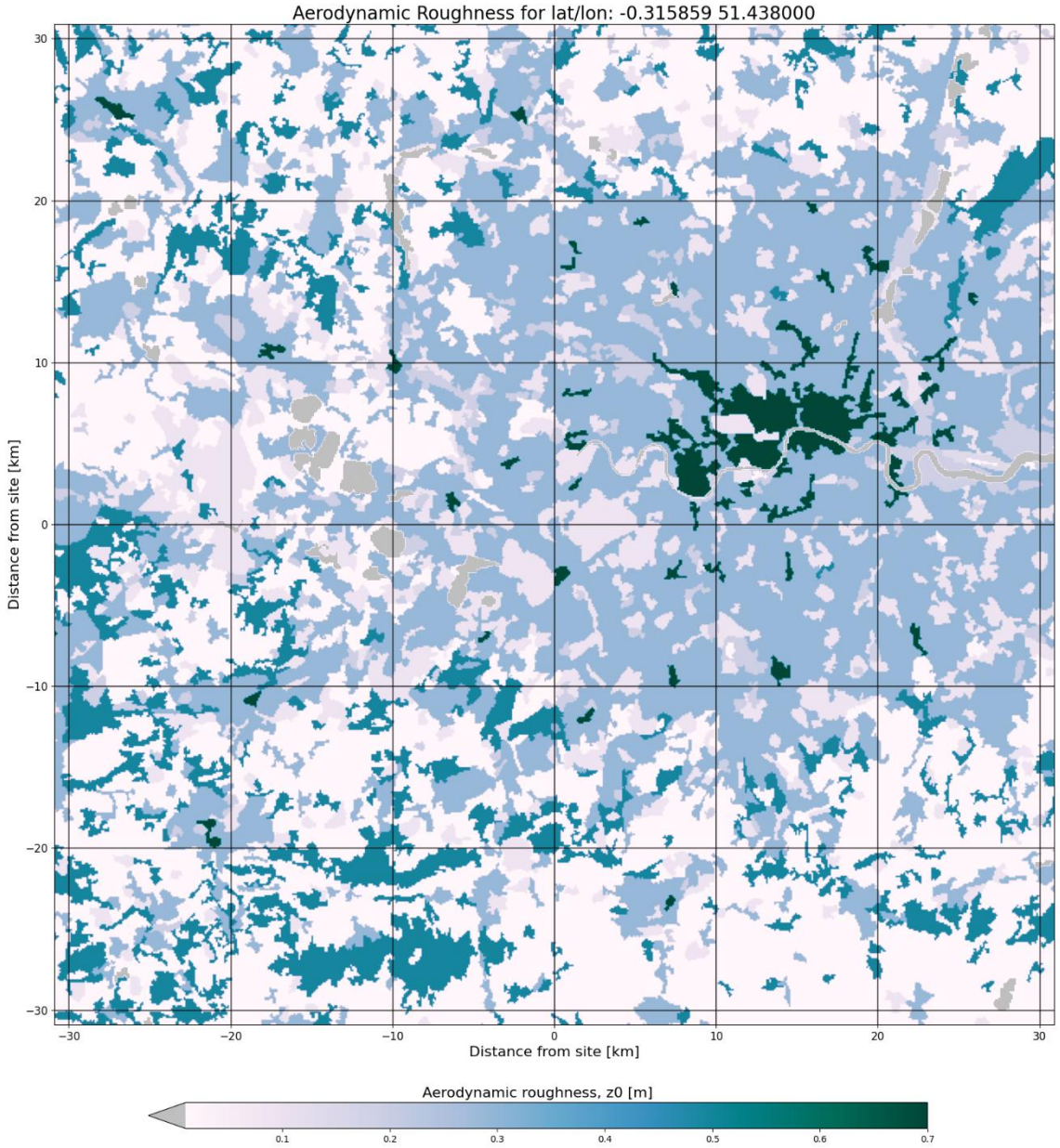


Table 2-1 – Transposition factors from 10m open country to reference height at approximately the highest point at project site (20m)

0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
0.97	0.97	1.02	1.05	1.02	0.96	0.96	1.00	0.98	0.97	0.99	0.96

2.4 GENERAL TARGET WIND CONDITIONS

2.4.1. The following are general target wind conditions for pedestrian level wind environments:

- Thoroughfares: Business / Leisure walking during windiest season;
- Pavements and Walkways: Leisure walking during windiest season;
- Building entrances, bus stops, drop off areas: Standing throughout the year; and
- Outdoor amenity and seating areas: Sitting during the summer season.

3 EXISTING CONDITIONS

3.1.1. The Site is located in the suburban district of Ham in LBRuT, south-west London and it is bound by Woodville Road to the north, Wiggins Lane and Ham Street to the east, Ashburnham Road to the south and The Woodville Centre and St. Richard's CE Primary School to the west. The site currently includes 14 1960s blocks comprising 192 homes.

3.1.2. In terms of the existing conditions, the wind environment is expected to be suitable and safe for the existing pedestrian activities including pedestrian circulation, leisure walking and standing for accessing buildings or waiting at bus stops. Though scattered through the Site, the existing buildings are generally only three storeys taller than the surrounding residences. Therefore, surrounding pavements, walkways and entrances of dwellings surrounding the Site are expected to have suitable conditions for their use. In addition, the surrounding private gardens facing the Site are generally contained within a solid fence and, therefore, are expected to enjoy amenable conditions. Some windiness is likely to be experienced occasionally in the larger green open areas in windy weather.

4 ASSESSMENT OF WIND EFFECTS AT THE PROPOSED DEVELOPMENT AND ITS SURROUNDINGS

4.1 PEDESTRIAN COMFORT

Pavements and Walkways

4.1.1. As the prevailing wind from the south-west reaches the site and interacts with the proposed development, it is likely that localised pockets of wind acceleration will be created, especially around building corners and at the east-west corridors; however, the severity of these effects would be limited by the low-rise nature of the proposed development. Moreover, the density and massing of the proposed scheme is greater than the existing baseline condition and is likely to provide additional shelter to the wind flow. Therefore, wind conditions along pavements and walkways within

and around the proposed ground-level development are expected to remain suitable for standing to leisure walking during the windiest season (Figures 4-1).

4.1.2. Within the site, localised windiness is likely to occur at building corner locations, especially at the corners of the taller blocks (C, R, S, V, E, I, M), and between buildings. This is due to potential for minor downdraughts of the prevailing wind from the south-west façade to reach pedestrian level and subsequently channel along and between the blocks and around corners. However, the wind effects on these pedestrian areas are not expected to be substantial and are expected to be suitable for the intended use.

4.1.3. In addition, all pedestrian pavements and walkways within the site are generally sheltered by the proposed landscape which is expected to help moderate wind speeds locally. Further notes are included in Figure 4-2.

Figure 4-1 – Site plan showing generic wind direction

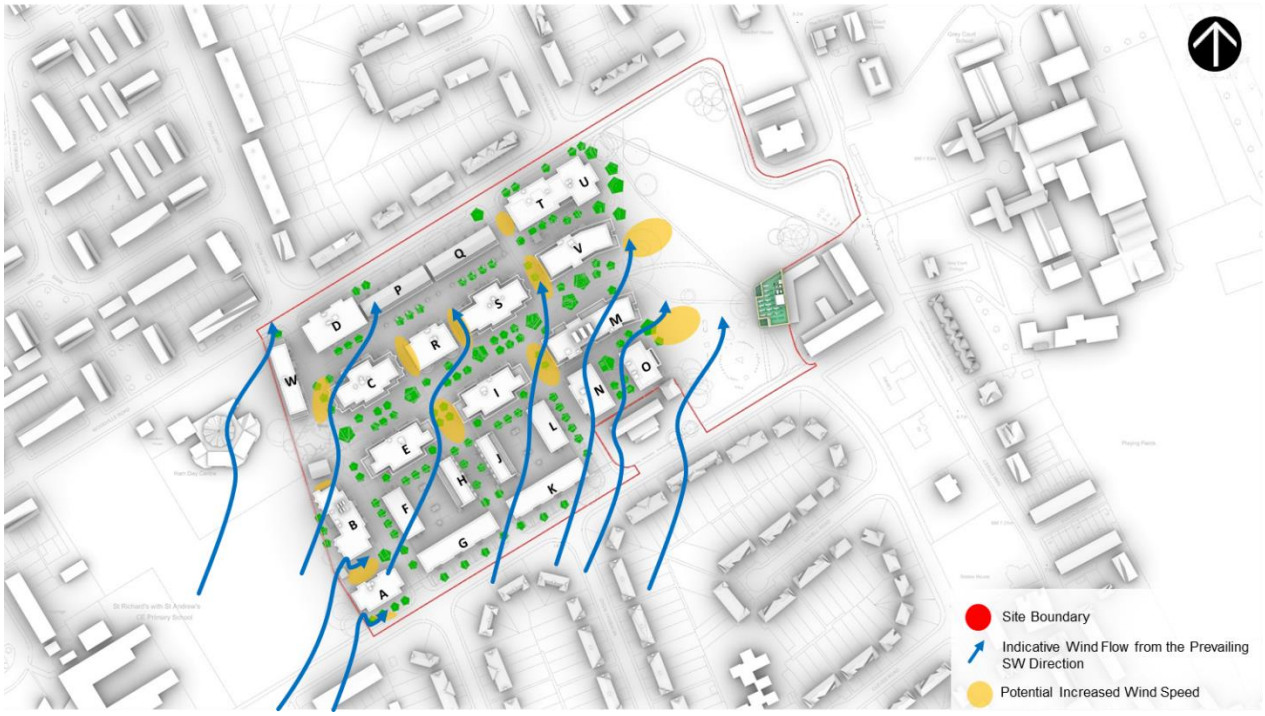
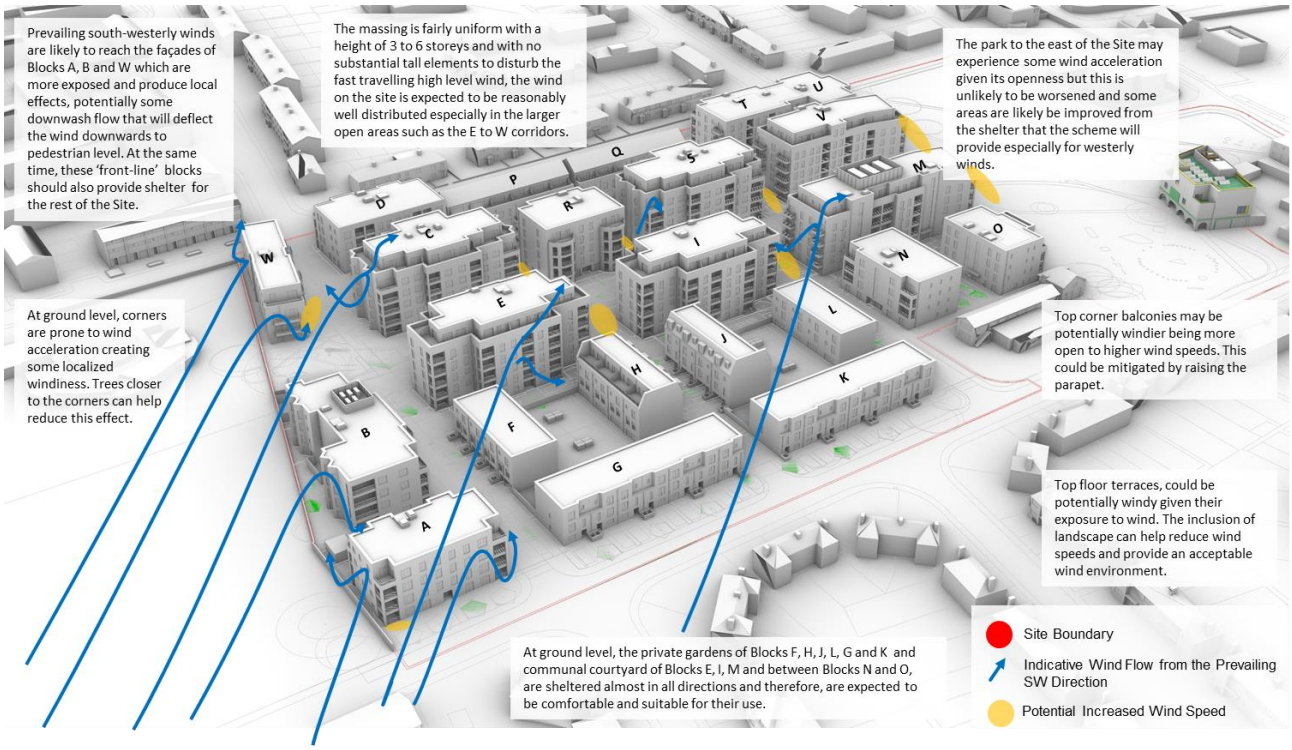


Figure 4-2 – Wind conditions around the site – SW view



Entrances

4.1.4. The wind conditions at building entrances around and within the site are likely to be suitable for standing which is the target wind condition for these areas.

4.1.5. Most of the entrances to the proposed development are either recessed, such as the private entrances to Blocks G, K, P and Q and the primary entrances of Blocks A, B, C, D, N, R, S, W, V, or protected by a canopy such as the primary entrances of Blocks M, O, U and both primary and private entrances of Block E, I and T. These measures are likely to improve the wind conditions around the entrances by providing localised shelter. Therefore, wind conditions at entrances within the site should be suitable for the intended use without the need for additional mitigation.

Open Spaces, Gardens, Balconies and Terraces

4.1.6. The proposed development includes a number of public open spaces, communal courtyards and private amenity spaces such as private courtyard and balconies and terraces as indicated in the proposed landscape plan in figure 4-3.

4.1.7. The majority of existing trees will be retained, and new proposed trees will be added throughout the scheme. The proposed landscape plan will contribute to further improve the wind conditions around the open spaces by providing localised shelter, especially along pavements and walkways, building corners and courtyards.

4.1.8. At ground level, the private gardens between Blocks F, H, J, L, G and K are likely to experience suitable wind conditions being sheltered almost in all directions. Also, at the communal courtyard of Blocks E, I, M and between Blocks N and O as above, it is anticipated that moderate wind conditions will be experienced during summer.

4.1.9. Some wind accelerations can be expected at the western entrance of the Linear Park, due to its exposure to the prevailing south westerly winds. However, this effect is not expected to be significant.

4.1.10. Within the site, as previously anticipated, localised windiness is likely to occur at building corner locations, especially at the corners of the taller blocks (C, R, S, V, E, I, M), and between buildings. However, these effects are not expected to be significant.

4.1.11. The top terraces and corner balconies of Blocks E, I, M, C, R, S and V (Figure 4-4), could potentially be subject to wind acceleration due to their exposure to wind and therefore, would benefit from local mitigation. Section 5 below outlines possible mitigation options.

4.1.12. Roof terraces have been excluded from the assessment as they are not accessible to the general public.

4.1.13. In general, during summer months the winds tend to be milder and therefore, by taking all the proposed landscape measures and mitigation recommendations into consideration, the ground floor amenity areas and the elevated levels terraces and balconies are likely to be suitable for the intended uses.

Figure 4-3 – Proposed Landscape – Trees Configuration

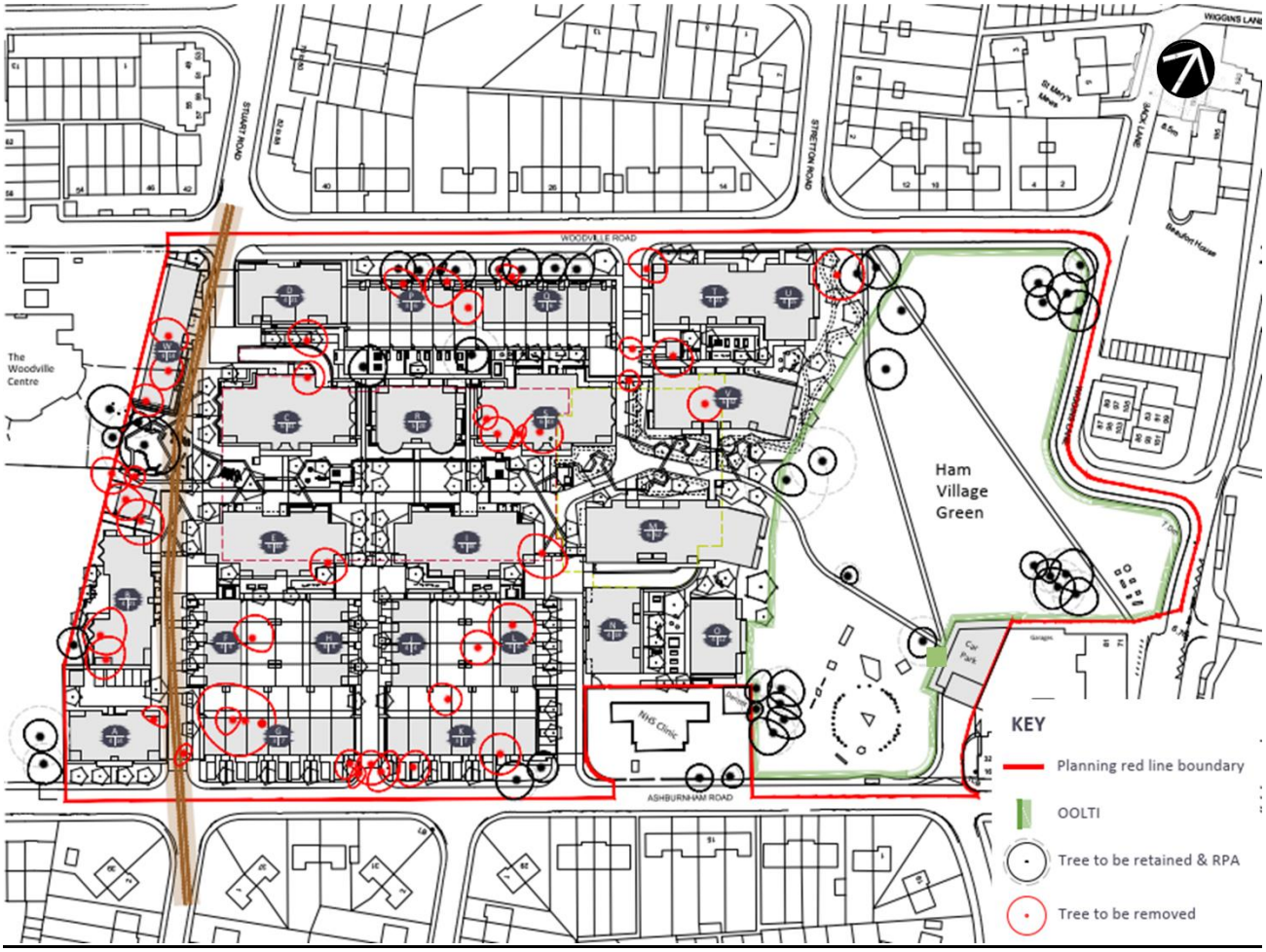


Figure 4-4 Areas that will potentially benefit with local mitigation

4.2 PEDESTRIAN SAFETY

4.2.1. Based on the qualitative assessment described above, the occurrence of winds in excess of 15 m/s for more than two hours per year are not expected. Therefore, all areas of the site and its close proximity are expected to be safe for all pedestrians.

5 MITIGATION

5.1.1. The assessment identified the top terraces and corner balconies of Blocks E, I, M, C, R, S and V as likely areas to be subject to wind acceleration and could therefore, benefit from local mitigation. The addition of a 1.5m height solid screen, as well as further planting, could generally be helpful to mitigate wind speeds and improve the wind conditions of these areas. The extent and actual requirement for these features could be confirmed during further detailed design.

5.1.2. At ground level trees in the surrounding area and the proposed landscaping within the site will contribute to providing a suitable wind environment, as they filter the incoming wind reducing the speeds locally, especially during periods when trees are in full foliage.

6 CONCLUSION

6.1.1. This report provides an assessment of the potential impact and likely suitability of wind conditions at pedestrian level within and around the proposed development at Ham Close.

6.1.2. A qualitative, experienced based analysis has been carried out using the drawings and models of the proposed scheme provided by the client, available satellite mapping of the site and long-term wind climate statistics applicable to the site.

6.1.3. The outcome can be summarised as follows:

Wind conditions at the surrounding areas

6.1.4. In terms of wind effects externally to the site, it is expected that these should be minimal and the wind environment at the surrounding areas of the site should remain within the thresholds of pedestrian comfort and safety. Some wind acceleration can be expected to the western entrance of the Linear Park where public amenity spaces are located due to their openness to the prevailing wind direction, although this is unlikely to be significant.

Wind conditions within the site

6.1.5. As the prevailing wind from the south-west reaches the site and interacts with the proposed development, it is likely that localised pockets of wind acceleration will be created, especially around building corners and at the east-west corridors; however, the severity of these effects would be limited by the low-rise nature of the proposed development. Therefore, wind conditions along pavements and walkways within the proposed development at ground level are generally expected to remain suitable for standing to leisure walking.

6.1.6. Most of the entrances throughout the proposed development are either recessed or protected by overhangs and are likely to experience suitable wind conditions for the intended pedestrian use.

Mitigation

6.1.7. The majority of existing trees will be retained, and new proposed trees will be added throughout the scheme. The proposed landscape plan will contribute to mitigate unwanted windiness and improve the wind conditions around the open spaces by providing localised shelter, especially along pavements, walkways, building corners and courtyards.

6.1.8. The assessment identified the top terraces and corner balconies of Blocks E, I, M, C, R, S and V as likely areas to be subject to wind acceleration and could therefore, benefit from local mitigation. The addition of a 1.5m height solid screen, as well as further planting, could generally be helpful to mitigate wind speeds and improve the wind conditions of these areas. The extent and actual requirement for these features could be confirmed during further detailed design.

7 REFERENCES

1. Lawson, T., 2001. Building aerodynamics, Imperial College Press [ISBN 1-86094-187-7]
2. ESDU 2010 Item 01008 ‘Computer program for wind speeds and turbulent properties: flat or hilly sites in terrain with roughness changes’

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