



Unlocking potential for a better built environment

WIND MICROCLIMATE ASSESSMENT REPORT

Trout Road, West Drayton

September 2025

GIA No: **21281**

PROJECT DATA:

Client **Troutbourne LLP**
Project Title **Trout Road, West Drayton**
Project Number **21281**

REPORT DATA:

Report Title **Wind Microclimate Assessment**
GIA Department **Wind Microclimate**
Dated **September 2025**
Prepared by **NS**
Checked by **JW**

Revisions	No:	Date:	Notes:	Signed:

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1 INTRODUCTION

This report outlines the results of a wind microclimate assessment for the proposed development at Trout Road, West Drayton in the London Borough of Hillingdon.

1.1 SUMMARY

Wind microclimate conditions for the proposed development at Trout Road were assessed using high resolution Computational Fluid Dynamics (CFD).

No wind safety risks at ground, terrace or balcony levels were identified either within the site or the surrounding area.

Wind comfort conditions are either suitable or consistent with the baseline for all thoroughfares, roadways, existing building entrances, proposed entrances, bus stops, existing parks and residential gardens, existing and proposed ground level amenity spaces, proposed terraces and proposed balconies.

The Proposed Development will have a beneficial impact on conditions for the existing spill-out seating area at the George and Dragon pub beer garden which would be made usable even in winter conditions by the inclusion of the Proposed Development.

The proposed development will not have any adverse impacts on long term wind microclimate.

1.2 GUIDANCE

National Planning Policy Framework (2024)

The National Planning Policy Framework (NPPF) was revised December 2024 by the Ministry of Housing, Communities & Local Government (MHCLG) The relevant paragraphs are as follows:

There is no specific planning policy guidance dealing with microclimate in terms of pedestrian comfort set out in the revised NPPF.

Planning Practice Guidance

The Planning Practice Guidance (2021) identifies the potential for tall and large buildings to affect wind microclimate. The National Design Guide (2021) states in Paragraph 71 that:

“Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily”

London Plan (2021)

The Greater London Authority (GLA) London Plan (2021) sets out the overall strategy for developments in London over the next 20-25 years. The relevant policies to wind microclimate are as follows:

Policy D8 (Public Realm) of the London Plan states that developments 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.”

Policy D9 (Tall Buildings) of the London Plan states that “wind, daylight, sunlight penetration and temperature conditions around the building(s) and neighbourhood must be carefully considered and not compromise comfort and the enjoyment of open spaces, including water spaces, around the building.

2 METHOD

To identify the likely effect of the proposed development on the pedestrian level wind environment, a 3D CFD model of the development and surrounding site was created. This section describes the methodology for the creation of this model and the inputs used.

2.1 ASSESSMENT METHODOLOGY

The assessment was performed using GIA's high-resolution Computational Fluid Dynamics (CFD) modelling.

CFD is a digital modelling technique, which simulates the effect of wind for the built environment. The air is divided into hundreds of millions of "cells", within which the equations of motion are solved. GIA uses cloud computing from Amazon Web Services (AWS) to run the simulations, to ensure vast scalability and appropriate resource availability for any project.

A full description of the test methodology is included in Appendix 01.

2.2 ESTABLISHING MICROCLIMATE CONDITIONS

Microclimate conditions were established using a high resolution CFD model, extending 400m radius from the Site.

A model of the development was included within the CFD model and tested to determine the conditions at and around the Site. The model used is shown in Figure 1 and Figure 2.

The model was run at full scale from 18 wind angles, spaced using 10° or 30° increments such that no sector contributes more than 10% of the annual wind.

Wind speeds were measured at 1.5m above any surfaces expected to be used for pedestrian activity.

On-site and local wind speeds were combined with wind statistics from 30 years of data recorded at London Heathrow and City airports for variations in terrain between the airports and the site, to obtain annual and seasonal frequency and magnitude of wind speeds across the model. This allows the 'grading' of the pedestrian level winds according to the Lawson Comfort Criteria, which are explained later in this report.

The wind microclimate effects are assessed annually, for the winter months (December, January and February) and for the summer months (June, July, August). Winter conditions are reported as this is the season when the strongest winds are expected, summer conditions are reported as this is the season when pedestrian usage of outdoor spaces is expected to be highest.

2.3 LIMITATIONS AND ASSUMPTIONS

The accuracy of the results is dependent upon the accuracy of the CAD used to construct the model.

The assessment herein is valid to the design as supplied to GIA at the time of the assessment, and does not cover future variations in the design.

There is an inherent assumption that on-site wind speeds will scale linearly with the measured wind speeds at the airport (since all wind probabilities are based on data measured at airfield anemometers).

There is an inherent assumption that the wind speed statistics for the past 30 years will remain applicable for the foreseeable future.

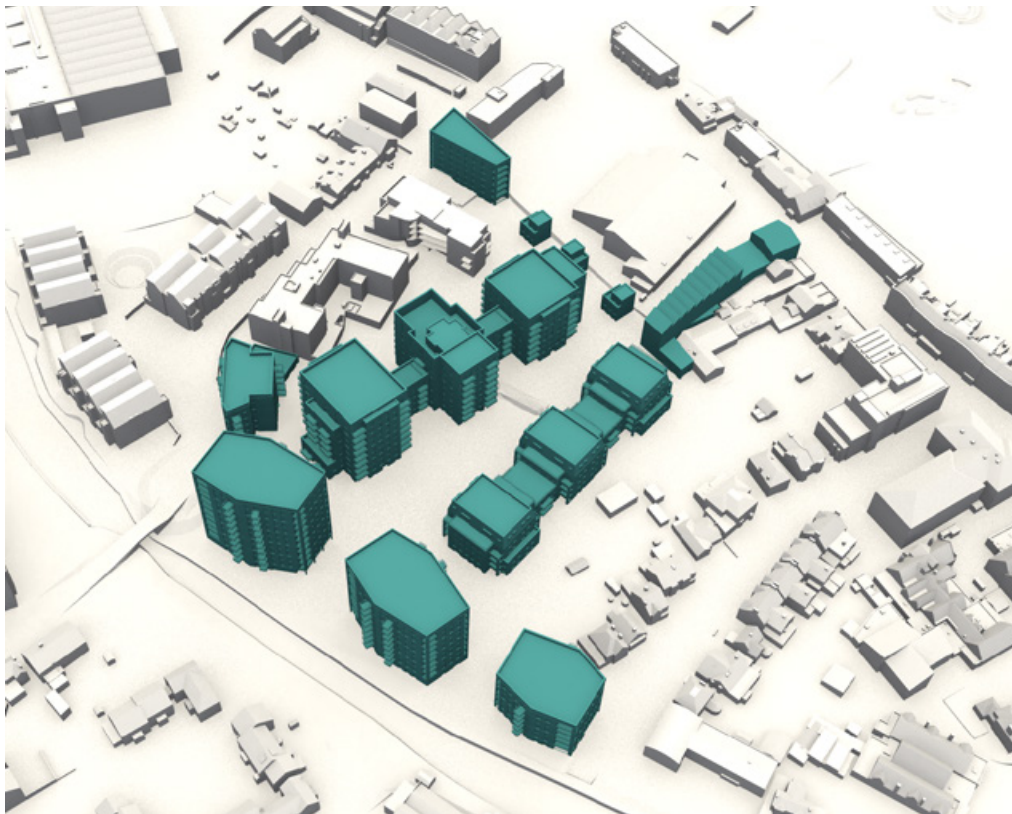


Fig. 01: 3D View of Proposed Development



Fig. 02: Proposed Development with Existing Surrounds



Fig. 03: Sensitive Wind Receptors

2.4 **LAWSON COMFORT AND SAFETY CRITERIA**

The assessment was graded against the Lawson Comfort and Safety Criteria.

Table 1 and Table 2 show the banding of the various categories within the Lawson Comfort and Safety criteria.

Comfort categories are based on the level of wind speed exceedance for 5% of each season, and safety categories are based on the level of wind speed exceedance for ~2 hours per year.

The assessment was performed using the London Docklands Development Corporation (LDDC) variant of the Lawson Comfort Criteria. The Lawson Criteria are well-established in the UK for quantifying wind conditions in relation to build developments and, although not a UK ‘standard’, the criteria are recognised by local authorities as a suitable benchmark for wind assessments. The Lawson Criteria have been adopted for this assessment.

Table 01: Lawson Comfort Criteria (LDDC variant)

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

Table 02: Lawson Safety Criteria (LDDC variant)

KEY	SAFETY CATEGORY	MEAN WIND SPEED (0.025% EXCEEDANCE)	DESCRIPTION
	No Safety Exceedance	<15 m/s	
	S15 (Distress)	>15 m/s	Unsafe for frail individuals, or cyclists
	S20 (Safety)	>20m/s	Wind conditions considered unsafe for all users

2.5 TARGET CONDITIONS

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

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

The areas immediately outside any building entrances should be suitable for standing use during winter to provide a “buffer” between the still conditions in interior spaces and the general thoroughfare. The principal entrances to the proposed development are marked “E” on Figure 3, and principal off-site entrances are marked “O”.

There are bus stops on the High Street (marked “B” on Figure 3). These are targeted to be suitable for standing in winter.

There is existing spill-out seating in the form of the George and Dragon pub beer garden at 176 High Street (marked “S1” on Figure 3). This is targeted to be suitable for sitting in summer.

There is ground level amenity in the form of Yiewsley Recreational Ground (marked “YRG” in Figure 3) and residential gardens (marked “G” in Figure 3). These are targeted to be suitable for a mix of sitting and standing in summer.

There is an existing mixed amenity space at Onslow Mills to the north of the site (marked “A1” in Figure 3) as well as proposed mixed amenity spaces within the proposed development (marked “A2”, “A3” and “A4” in Figure 4). These spaces are targeted to be suitable for a mix of sitting and standing in summer.

There are proposed roof terraces within the proposed development on levels 1 and 7 of Block B, levels 3 and 4 of Block D and level 3 of Block J. These are targeted to be suitable for a mix of sitting and standing in summer.

There are balconies across the proposed development. These are targeted to be suitable for sitting or standing in summer.

The locations of the sensitive receptors are shown in Figure 3.

SCENARIOS

The purpose of these tests was to compare conditions with and without the proposed development.

The following scenarios were tested:

- 1 Baseline: The existing (previous) building on site, with the existing surrounds (including any planning consented schemes which are under construction at the time of writing);
- 2 Proposed Development with Existing Surrounds: The completed and operational development with the existing surrounds.

Trees and soft landscaping were included in the model, in accordance with the submitted landscaping plans and including existing off-site trees to the south of the canal.

3 RESULTS

3.1 CONDITIONS FOR EXISTING SITE WITH EXISTING SURROUNDS (BASELINE)

Annual safety at ground level for the existing site with existing surrounds is shown in Figure 4. Winter comfort at ground level for the existing site with existing surrounds is shown in Figure 5. Summer comfort at ground level for the existing site with existing surrounds is shown in Figure 6.

There are no safety exceedances at ground level either within the site or in the surrounding area.

Conditions range between suitable for sitting, standing and leisure walking in winter and between sitting and standing in summer.

Conditions for principal off-site entrances (marked "O" in results figures) range between suitable for sitting or standing in all seasons. This is suitable for the intended use.

Conditions for the bus stops on the High Street (marked "B" in results figures) are suitable for standing in winter. This is suitable for the intended use.

Conditions for the existing spill-out seating in the George and Dragon pub beer garden (marked "S1" in results figures) is suitable for standing in summer. This is one category windier than the target conditions.

Conditions for Yiewsley Recreational Ground (marked "YRG" in results figures) are suitable for a mix of sitting and standing in summer. This is suitable for the intended use.

Conditions for off-site residential gardens (marked "G" in results figures) are suitable for a mix of sitting and standing in summer. This is suitable for the intended use.

Conditions for the existing mixed amenity space at Onslow Mills to the north west of the site (marked "A1" in results figures) is suitable for a mix of sitting and standing in all seasons. This is suitable for the intended use.



Fig. 04: Annual Safety, Existing Site with Existing Surrounds (Baseline)

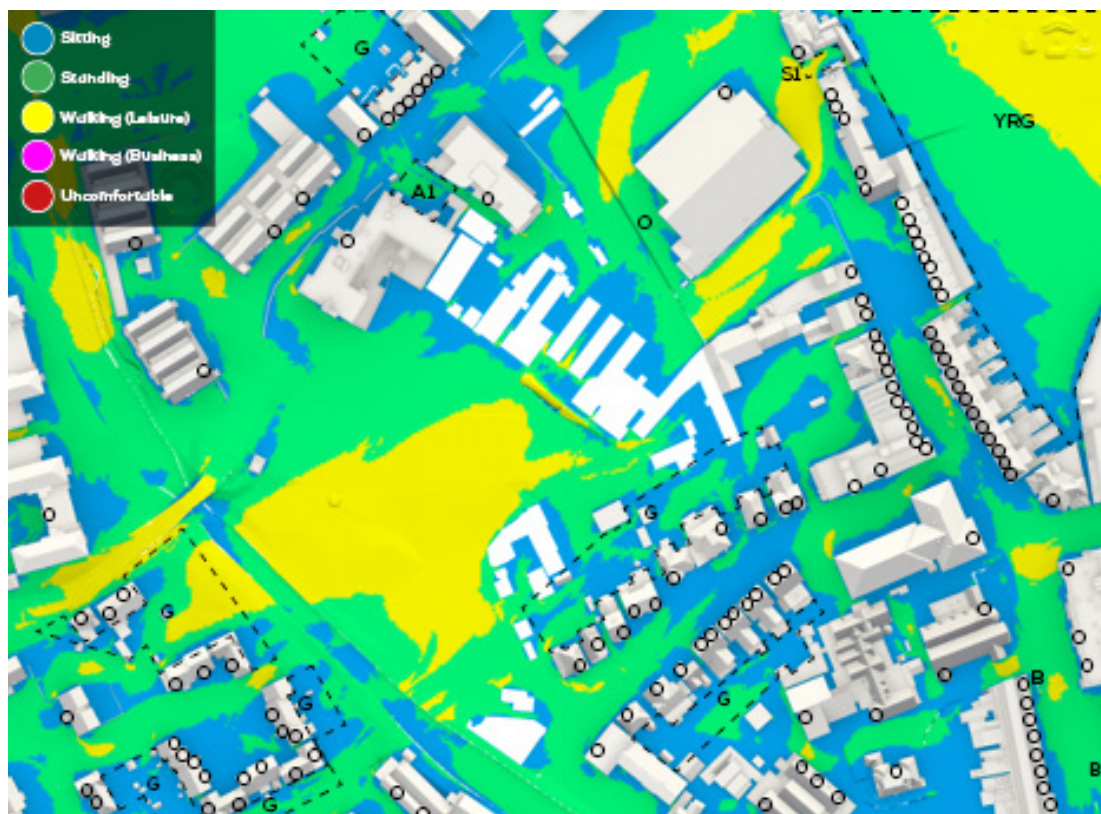


Fig. 05: Winter Comfort, Existing Site with Existing Surrounds (Baseline)

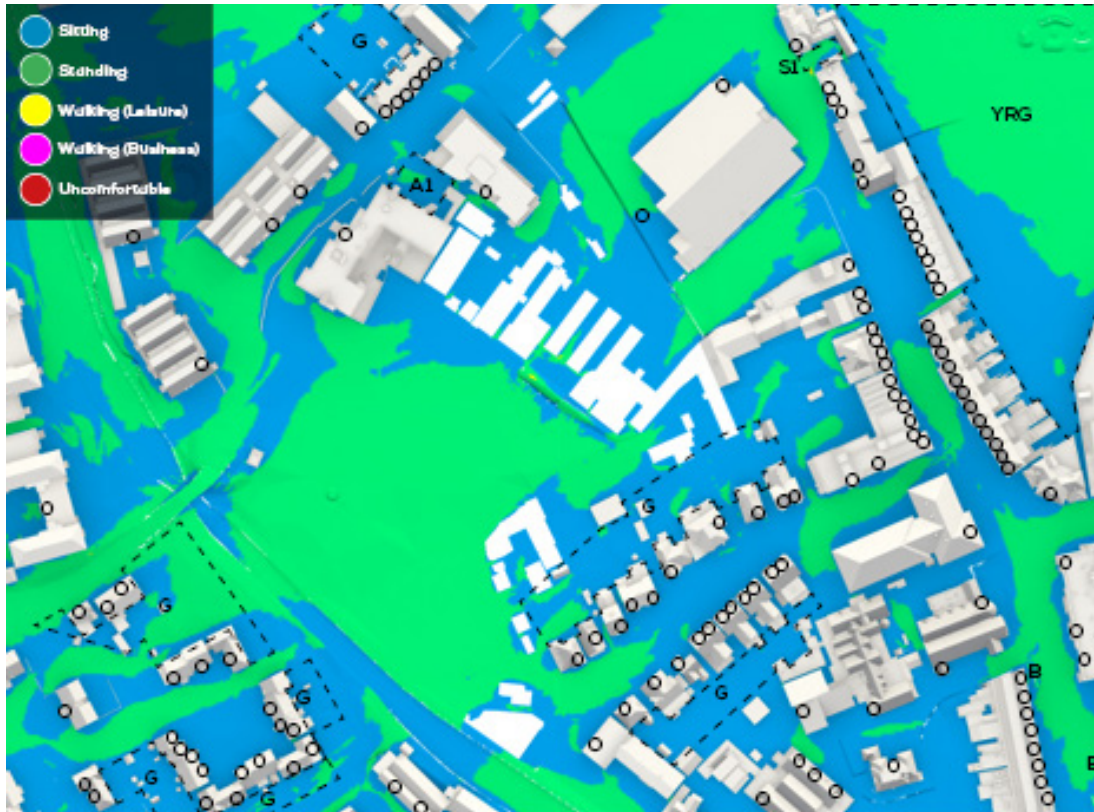


Fig. 06: Summer Comfort, Existing Site with Existing Surrounds (Baseline)

3.2 CONDITIONS FOR PROPOSED DEVELOPMENT WITH EXISTING SURROUNDS

Ground Level Conditions

Annual safety at ground level for the proposed development with existing surrounds is shown in Figure 7. Winter comfort at ground level for the proposed development with existing surrounds is shown in Figure 8. Summer comfort at ground level for the proposed development with existing surrounds is shown in Figure 9.

There are no safety exceedances at ground level either within the site or in the surrounding area.

Conditions range between suitable for sitting, standing, leisure walking and business walking in winter and sitting, standing and leisure walking in summer.

Conditions for principal off-site entrances (marked "O" in results figures) range between suitable for sitting or standing in all seasons. This is suitable for the intended use.

Conditions for principal proposed entrances (marked "E" in results figures) are suitable for sitting and standing in winter. This is suitable for the intended use.

Conditions for the bus stops on the High Street (marked "B" in results figures) are suitable for standing in winter. This is suitable for the intended use.

Conditions for the existing spill-out seating in the George and Dragon pub beer garden (marked "S1" in results figures) is suitable for sitting in summer. This is one category calmer than the baseline and is suitable for the intended use.

Conditions for Yiewsley Recreational Ground (marked "YRG" in results figures) are suitable for a mix of sitting and standing in summer. This is suitable for the intended use.

Conditions for off-site residential gardens

(marked "G" in results figures) are suitable for a mix of sitting and standing in summer. This is suitable for the intended use.

Conditions for the existing mixed amenity space at Onslow Mills to the north west of the site (marked "A1" in results figures) are suitable for sitting in all seasons. This is one category calmer than the baseline and is suitable for the intended use.

Conditions for the proposed mixed amenity space through the centre of the proposed development (marked "A2" in results figures) are suitable for a mix of sitting and standing in summer. This is suitable for the intended use.

Conditions for the proposed mixed amenity spaces between Blocks G, F and E (marked "A3" and "A4" in results figures) are suitable for standing in summer. This would be suitable for use as play space and for occasional "perch" sitting.

Elevated Level Conditions

Annual safety at terrace levels with the proposed development in existing surrounds is shown in Figure 10. Winter comfort at terrace levels with the proposed development with existing surrounds is shown in Figure 11. Summer comfort at terrace levels with the proposed development with existing surrounds is shown in Figure 12.

There are no wind safety risks identified on the proposed terrace and conditions are suitable for a mix of sitting and standing in summer. This is suitable for the intended use.

Annual safety at balcony levels with the proposed development in existing surrounds is shown in Figure 13. Winter comfort at balcony levels with the proposed development with existing surrounds is shown in Figure 14. Summer comfort at balcony levels with the proposed development with existing surrounds is shown in Figure 15.

There are no wind safety risks identified at balcony levels and conditions are suitable for sitting or standing across the usable space of each balcony. This is suitable for the intended use.



Fig. 07: Annual Safety, Proposed Development with Existing Surrounds

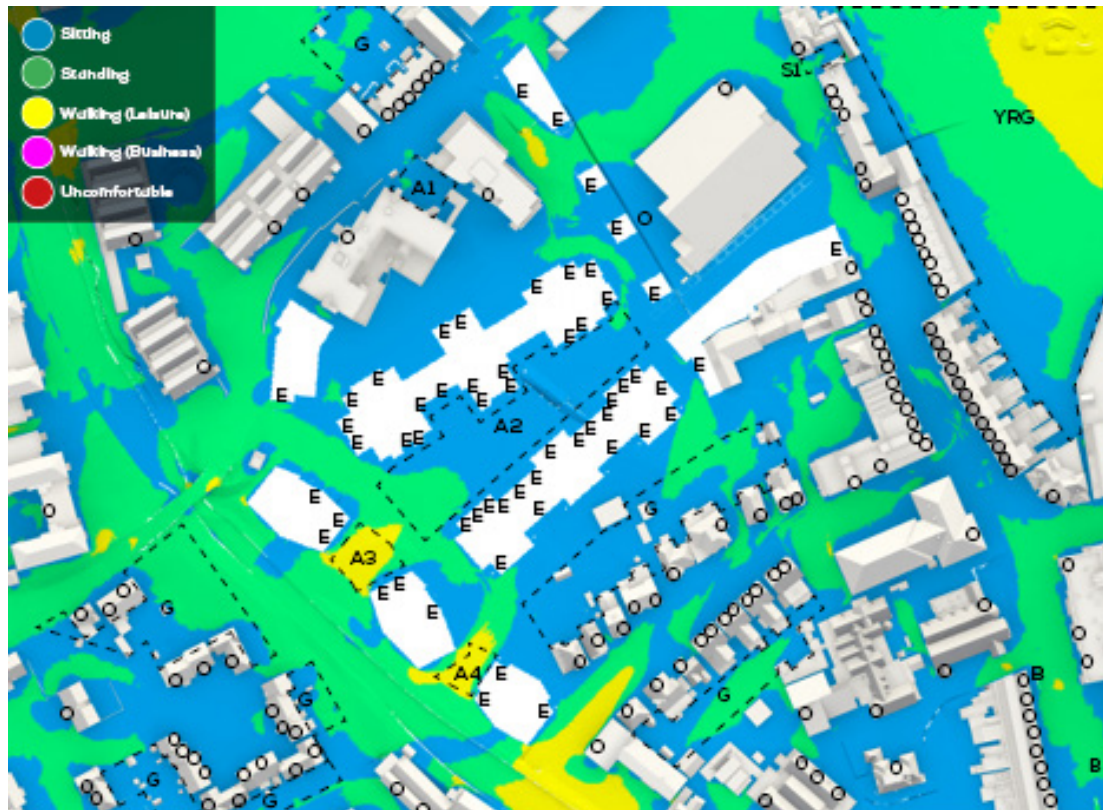


Fig. 08: Winter Comfort, Proposed Development with Existing Surrounds

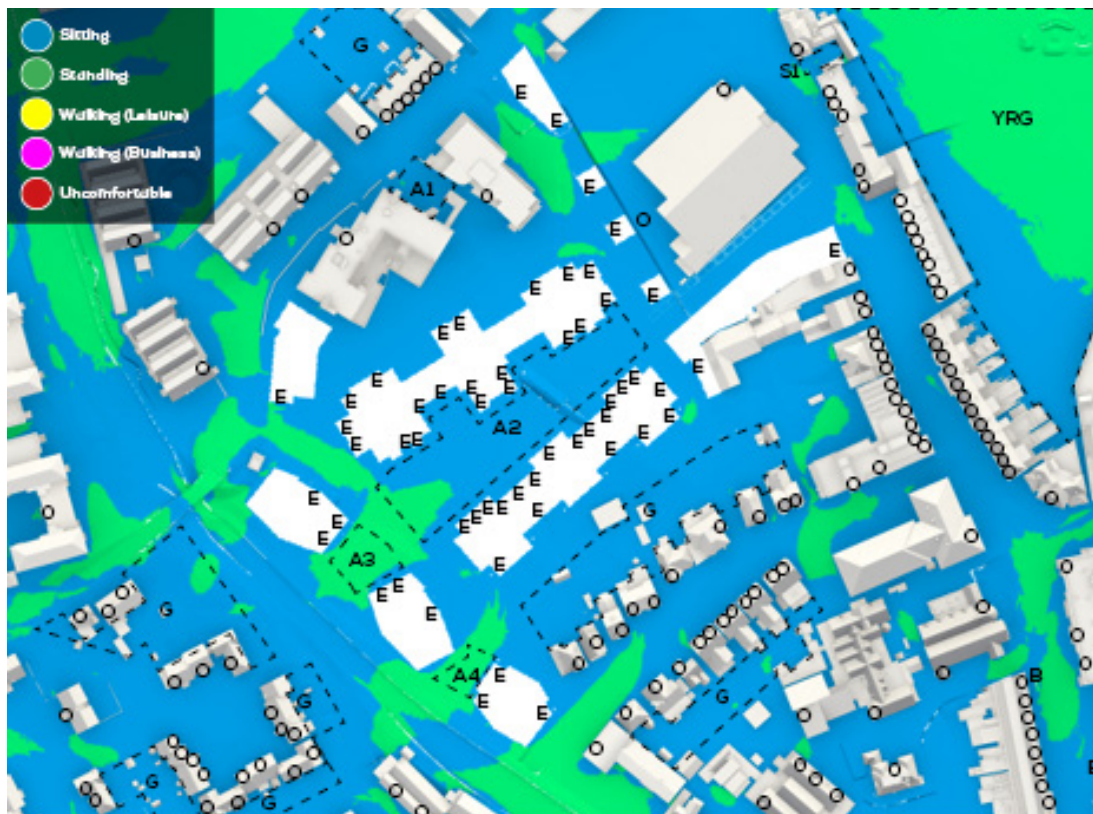


Fig. 09: Summer Comfort, Proposed Development with Existing Surrounds



Fig. 10: Annual Safety at Terrace Levels with Existing Surrounds



Fig. 11: Winter Comfort at Terrace Levels with Existing Surrounds



Fig. 12: Summer Comfort at Terrace Levels with Existing Surrounds

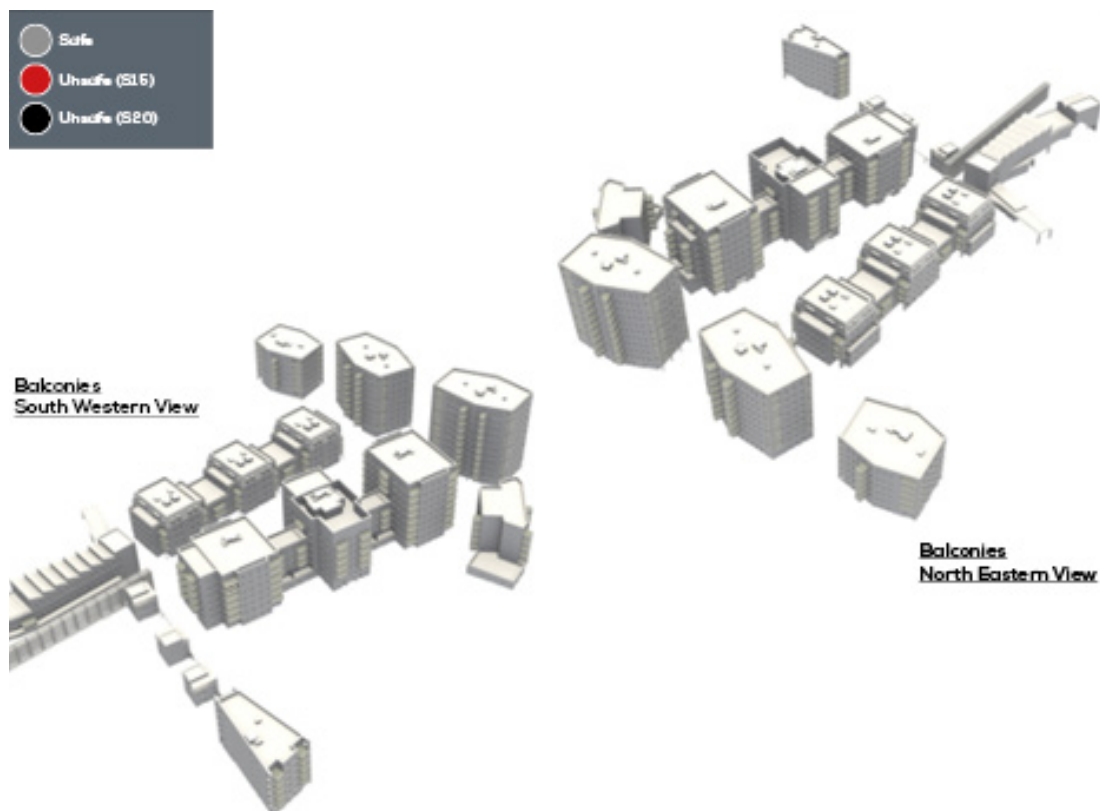


Fig. 13: Annual Safety at Balcony Levels, Proposed Development with Existing Surrounds

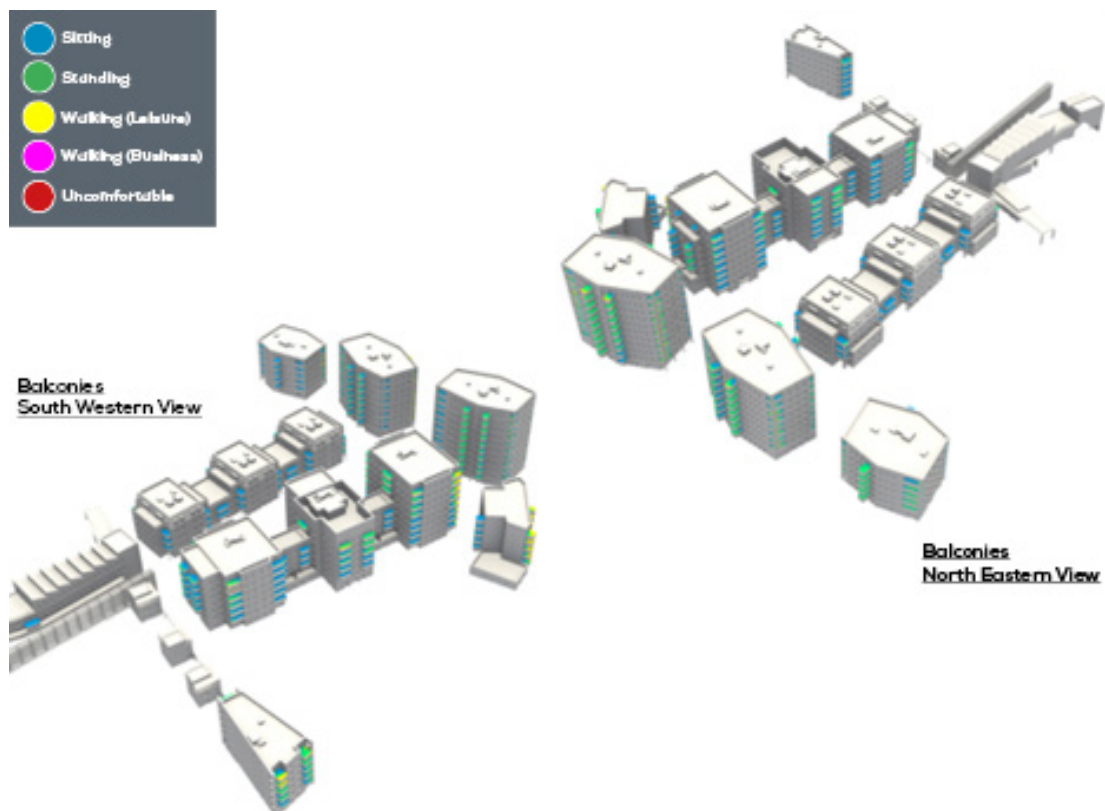


Fig. 14: Winter Comfort at Balcony Levels, Proposed Development with Existing Surrounds

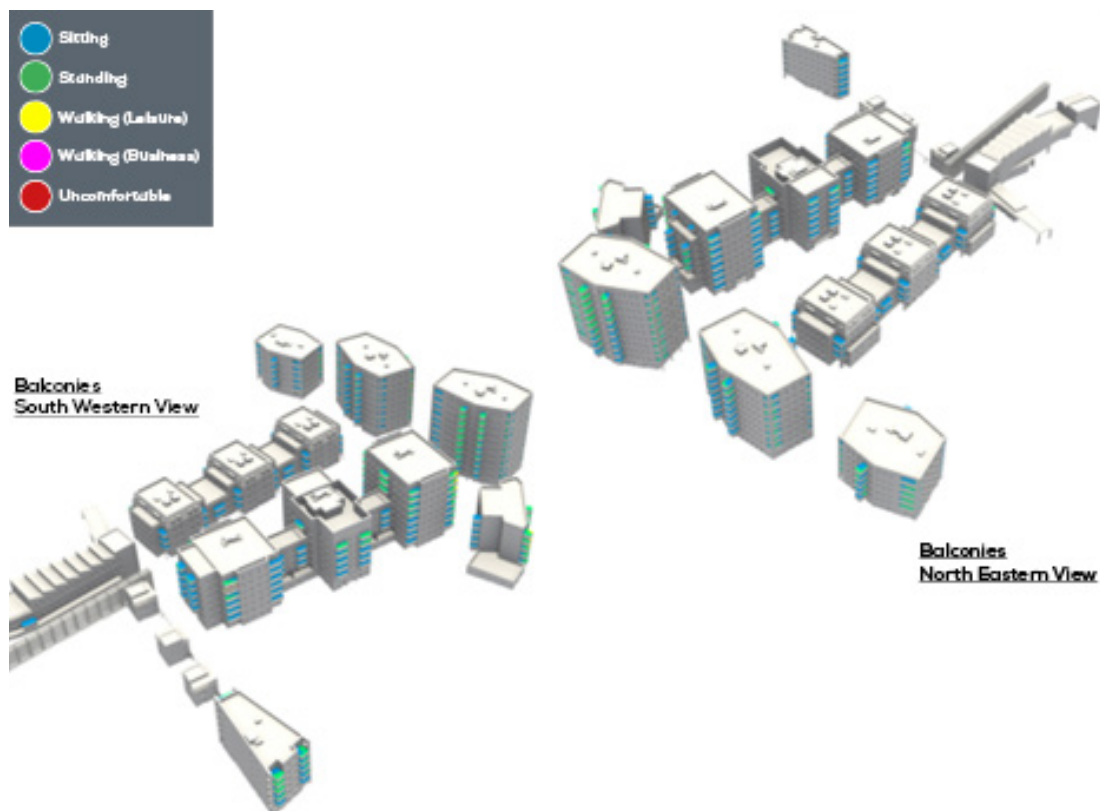


Fig. 15: Summer Comfort at Balcony Levels, Proposed Development with Existing Surrounds

4 CONCLUSIONS

Wind microclimate conditions for the proposed development at Trout Road were assessed using high resolution Computational Fluid Dynamics (CFD).

No wind safety risks at ground, terrace or balcony levels were identified either within the site or the surrounding area.

Wind comfort conditions are either suitable or consistent with the baseline for all thoroughfares, roadways, existing building entrances, proposed entrances, bus stops, existing parks and residential gardens, existing and proposed ground level amenity spaces, proposed terraces and proposed balconies.

The Proposed Development will have a beneficial impact on conditions for the existing spill-out seating area at the George and Dragon pub beer garden which would be made usable even in winter conditions by the inclusion of the Proposed Development.

The proposed development will not have any adverse impacts on long term wind microclimate.

APPENDIX 01

DETAILED METHODOLOGY

CFD METHODOLOGY

The CFD was performed using OpenFOAM.

Meshed using a hybrid mesh of hexahedral, polyhedral, tetrahedral and prismatic elements:

- On site building edge length: 0.05m – 0.25m
- Surrounding context edge length: 0.25m – 1m

Prismatic cells were used in the boundary layer region, with 4 layers of cells growing with an expansion ratio of 1.15 and aspect ratios between 0.1 and 0.4.

The total mesh size was between 84 and 93 million cells. Mesh detail is shown in Figure 16 and Figure 17.

Buildings within 400m of the site were included.

The domain was 5000mx5000m, with a blockage ratio of 0.5%

The blockage ratio uses a “test section” of 600mx200m (within which detail is captured).

Run using the SST turbulence model with high Re wall functions to ensure mesh suitability.

The simulations were steady state and isothermal.

2nd order discretisation schemes were used.

Convergence was measured as the residuals of the continuity, x-velocity, y-velocity, z-velocity, k and omega equations all falling by at least 2 orders of magnitude, and by measured static pressure on the site buildings varying by less than 1% over the final 100 iterations.

The wind speed is corrected into a “gust-equivalent” mean. The gust-equivalent mean is calculated using an empirical relationship between the gust and mean ratios recorded at over 13,000 data points from wind tunnel tests. This method is found to give a significant correlation improvement over the more traditional methods based on the CFD turbulent kinetic energy field.

WIND CLIMATE METHODOLOGY

The simulations were performed from 18 wind directions, spaced such that no single direction contributed more than 10% of the annual winds.

The directions simulated were 0°, 30°, 60°, 90°, 120°, 150°, 180°, 200°, 210°, 220°, 230°, 240°, 250°, 260°, 270°, 280°, 300°, 330°.

Seasonal wind roses for the combined London weather dataset are shown in Figure 18.

Target wind profiles for the site, from each wind direction, were generated using sectoral analysis of the terrain surrounding the site and the local weather stations with ESDU 2010 Item 01008 ‘Computer program for wind speeds and turbulent properties: flat or hilly sites in terrain with roughness changes’. The target wind profiles, compared to the wind speeds measured from the CFD model are shown in Figure 19.



Fig. 16: Mesh Detail on Site Buildings

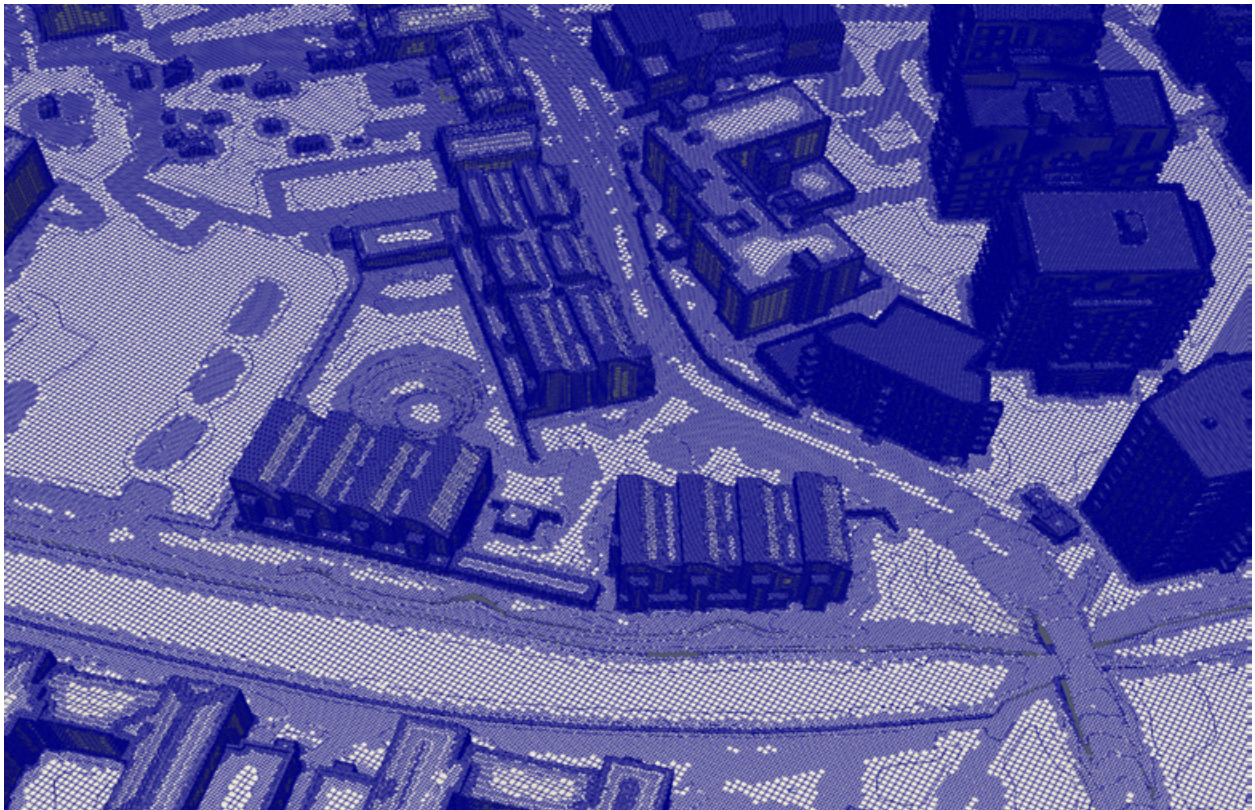


Fig. 17: Mesh Detail on Surrounds

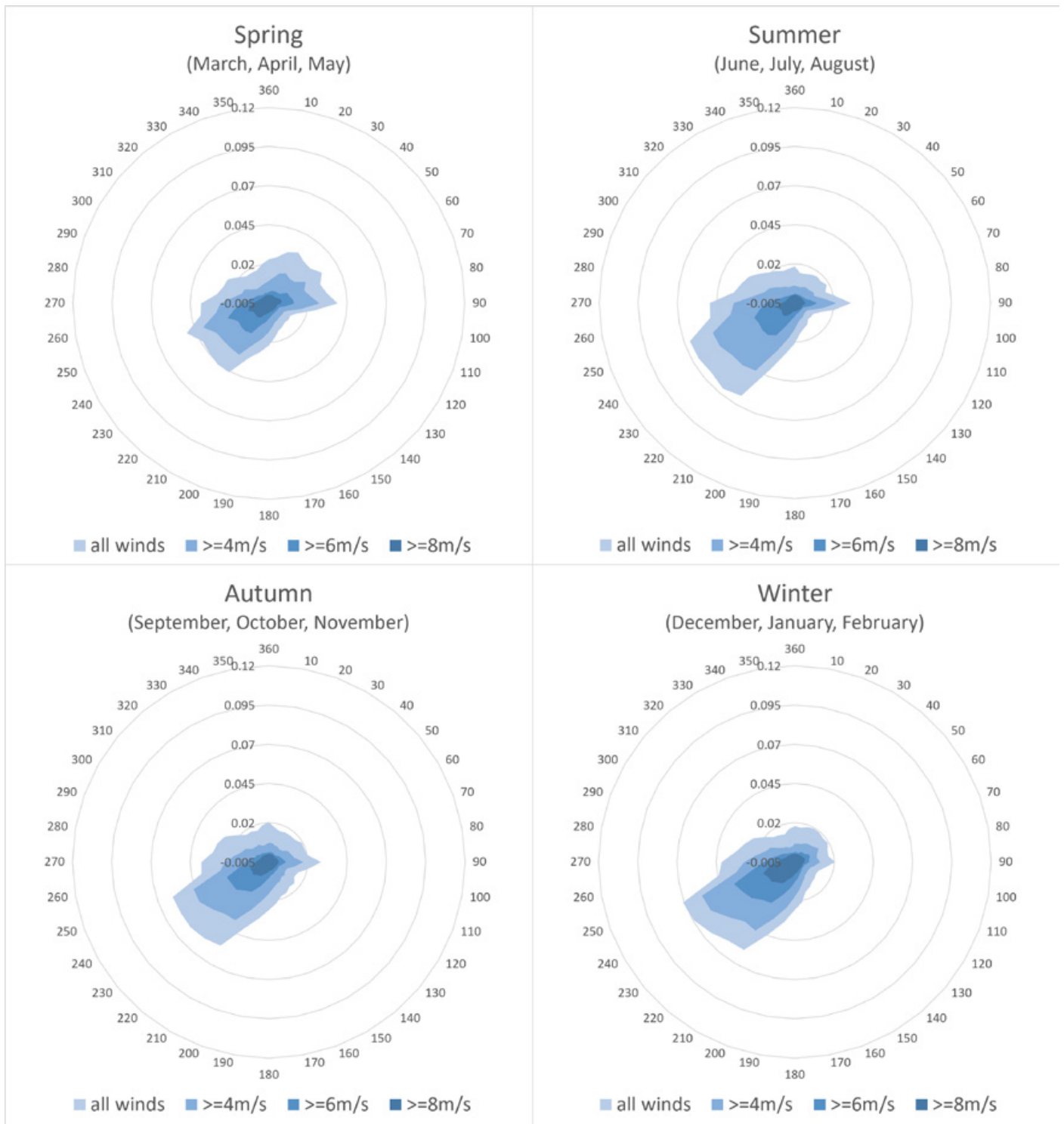


Fig. 18: Seasonal Wind Roses for London (Combined)

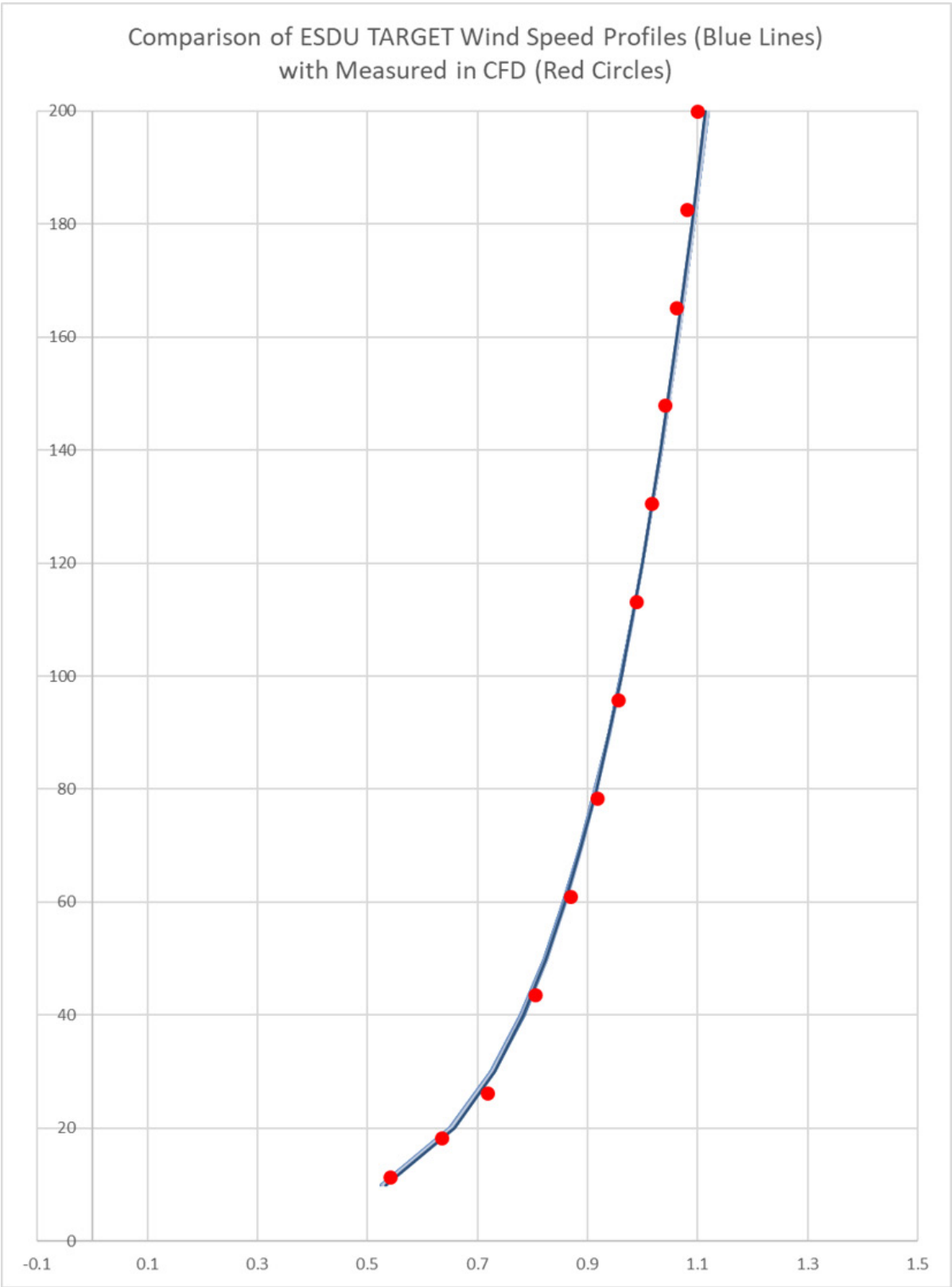


Fig. 19: Wind Profile for Trout Road, West Drayton



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Rights of Light
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