100 Avenue Road

Wind Microclimate Assessment Report

February 2025

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WIND MICROCLIMATE ASSESSMENT REPORT

100 Avenue Road

10 February 2025

GIA No: **20841**

PROJECT DATA:

Client	**Regal Avenue Road Limited**
Project Title	**100 Avenue Road, Camden**
Project Number	**20841**

REPORT DATA:

Report Title	**Wind Microclimate Assessment**
GIA Department	**Wind Microclimate**
Dated	**10 February 2025**
Prepared by	**NS**
Checked by	**JW**

Revisions	No:	Date:	Notes:	Signed:

CONTENTS

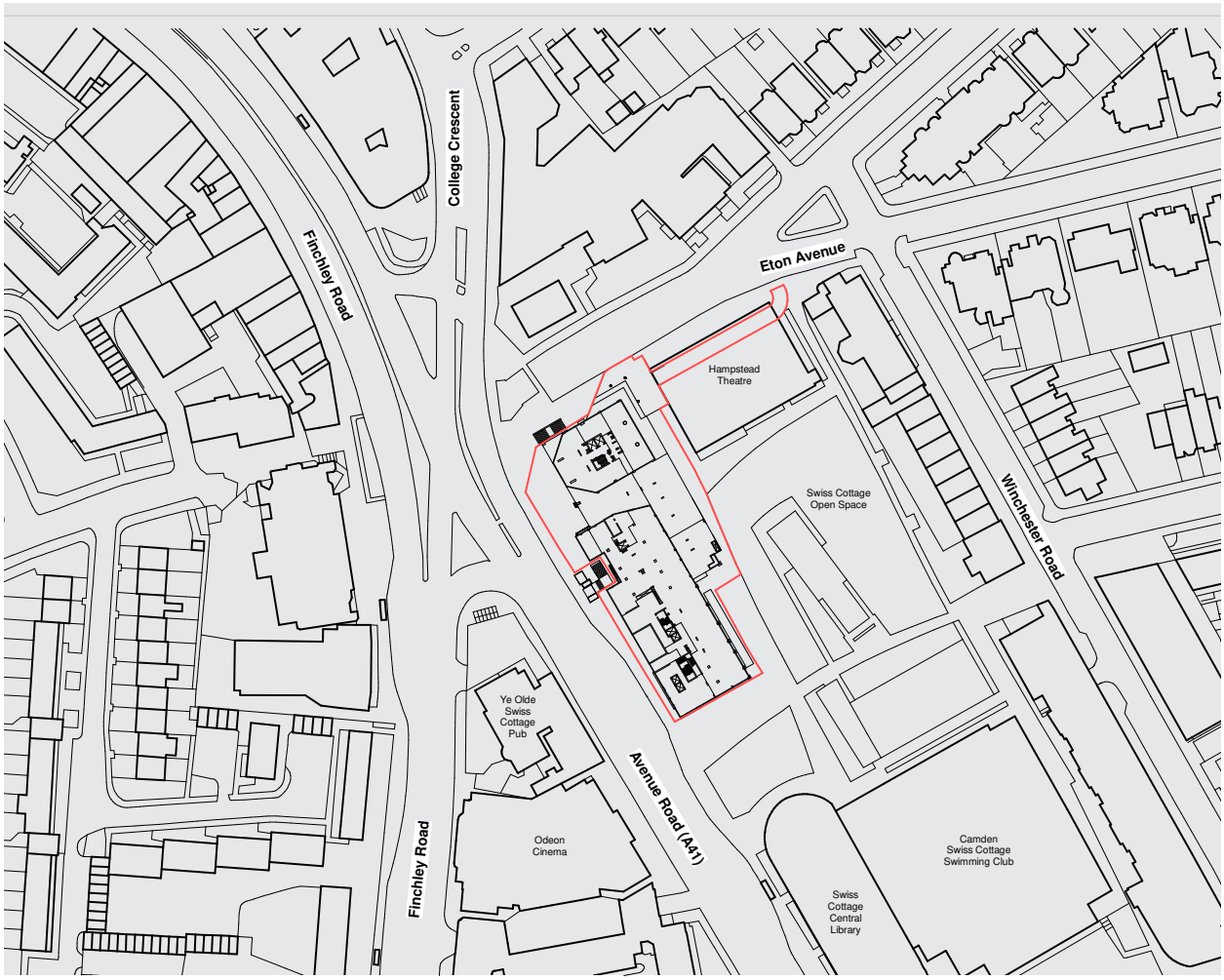
1 INTRODUCTION

This report outlines the results of a wind microclimate assessment for the Proposed Development at 100 Avenue Road in the London Borough of Camden.

The Proposed Development consists of the demolition of the existing building and redevelopment comprising residential units (Class C3) and flexible commercial, business and service use (Class E) and community use (Class F2(b)) with associated works including enlargement of the existing basement level to contain disabled car parking spaces and cycle parking, landscaping and access improvements.

The Site is bounded on its western side by Avenue Road and the Swiss Cottage/ Finchley Road junction and gyratory. Ye Olde Swiss Cottage pub is located directly opposite on the western side of Avenue Road, facing on to the junction. On the northern side the Site is bounded by the western end of Eton Avenue which is pedestrianised. To the east of the Site is Swiss Cottage Open Space and to the south of the Site is Swiss Cottage Library.

The Site is within the Finchley Road town centre and is allocated within the Camden Local Plan and the draft Camden Local Plan for an indicative capacity of 184 additional permanent self-contained homes.



1.1 SUMMARY

Wind microclimate conditions for the proposed development at 100 Avenue Road were assessed using high resolution Computational Fluid Dynamics (CFD).

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

Wind comfort conditions would be suitable for all intended uses (or no worse than the baseline conditions) for all thoroughfares, roadways, proposed or existing building entrances, bus stops, the stalls of Swiss Cottage Farmers Markets, existing amenity spaces, the proposed level 6 terrace and the proposed balconies.

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

1.2 BACKGROUND

This report is in support of a Section 73 application pursuant to the Implemented Permission with planning ref. 2014/1617/P (as amended under 2016/2048/P, 2018/4239/P, 2019/1405/P and 2022/1609/P).

The Implemented Permission (ref. 2014/2617/P) was granted via Appeal (ref. APP/X5210/W/14/3001616) on 18 February 2016.

It has been subject to further scheme amendments facilitated under Section 96a of the Town & Country Planning Act (1990) (As Amended) and has been lawfully implemented, which was confirmed with a certificate of lawfulness issued on 8 February 2018 (ref: 2017/6884/P).

Whilst demolition works and basement construction works have undertaken by the previous owner (Essential Living (Swiss Cottage) Limited), above ground construction works in respect of the Implemented Permission have stalled.

Regal Avenue Road Limited acquired the Site in 2024 and intend to bring forward the scheme as soon as practicable, subject to securing some amendments to the Implemented Permission to ensure its deliverability and compliance with the latest standards / Building Regulations.

The Implemented Permission was supported by a wind tunnel based wind microclimate assessment dated February 27 2014. The results of the current assessment show a consistent level of wind conditions with those reported for the Implemented Permission.

1.3 GUIDANCE

National Planning Policy Framework (2024)

The National Planning Policy Framework (NPFF) 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.

Camden Local Plan (2017)

Paragraph 6.24 of the Camden Local Plan (2017) states that:

"Large developments can alter the local climate. Buildings can affect the flow of air and cause wind tunnels which can potentially affect the enjoyment of public spaces...Developments should therefore consider local topography and the local microclimate in their design."

Camden Planning Guidance - Amenity (2021)

Section 7 of the Camden Amenity CPG (2021) sets out the requirements for a wind assessment within LBC. The key messages are:

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

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, Figure 2 and Figure 3.

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. The wind angles which were run are indicated in Appendix 01.

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.

The mean correction factors between the site and the airport are shown in Table 1.

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.

Table 01: Site Wind Correction Factors

DIRECTION (°N)	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
Corr. Factor	1.37	1.4	1.37	1.41	1.36	1.38	1.38	1.47	1.47	1.47	1.37	1.39

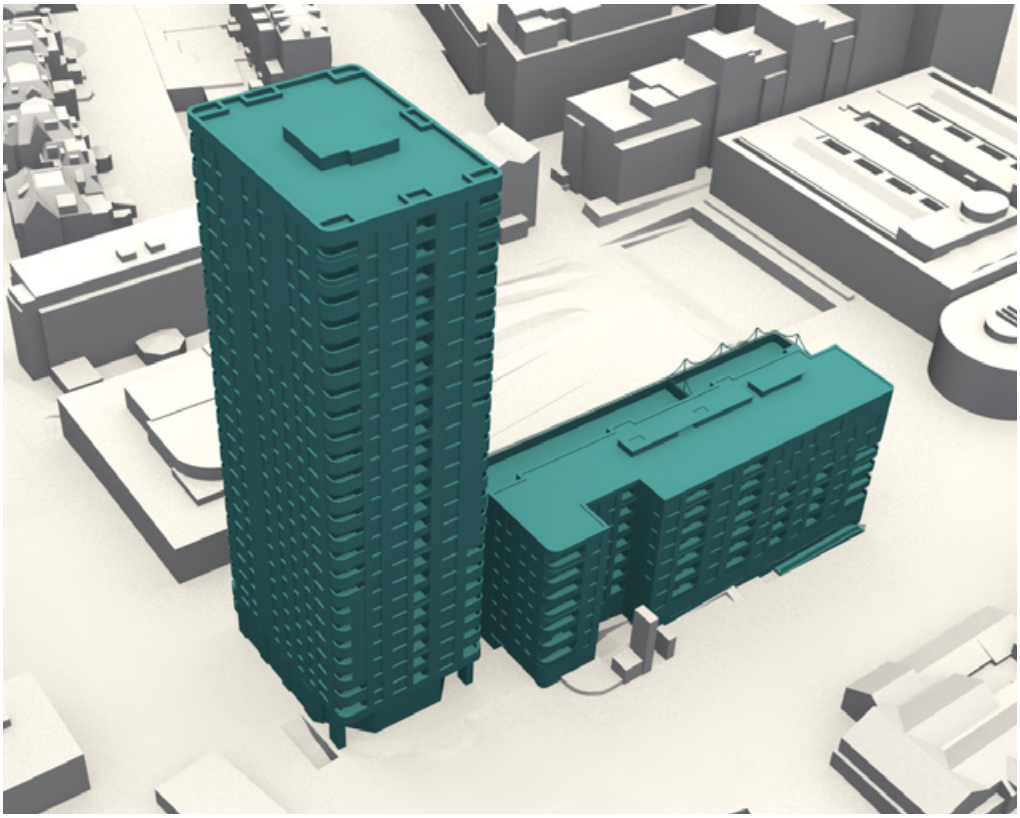


Fig. 01: 3D View of proposed Development

Fig. 02: Proposed Development with Existing Surrounds

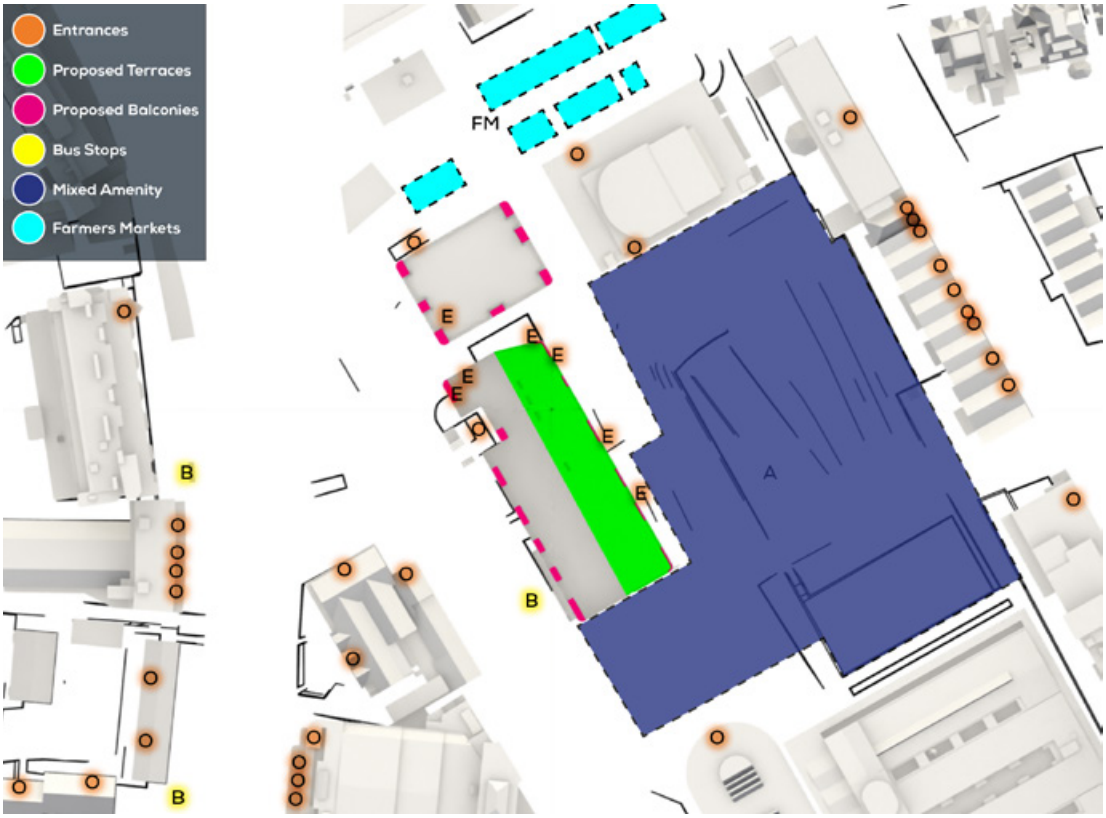


Fig. 03: Sensitive Wind Receptors

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 02: 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 03: 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 to classify wind conditions in accordance with 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 Finchley and Avenue Road (marked "B" on Figure 3). These are targeted to be suitable for standing in winter.

Swiss Cottage Farmer's Market is located directly north of the site (marked "FM" in Figure 3), The areas around the stalls are targeted to be suitable for standing at worst.

There are ground mixed floor amenity spaces in the form of an existing park, sports ground and communal exercise area (marked "A" on Figure 3). These spaces are targeted to be suitable for sitting in summer.

There is a residential terrace on level 6, which is targeted to be suitable for a mix of sitting and standing in summer.

There are balconies within 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.

The above target conditions were achieved for the 2014 wind assessment which supported the Implemented Permission, with the exception of one roof terrace for the tower and one proposed entrance. The design of the S73 Amendment Application does not include the aforementioned roof terrace, and the proposed entrances have located away from the windier conditions.

2.6 SCENARIOS

The purpose of these tests was assess the impact of the proposed development on wind conditions on and around the site.

The following scenarios were tested:

1. Baseline: The existing building on site, with the existing surrounds; and
2. Proposed Development with Existing Surrounds: The completed and operational development with the existing surrounds.

Existing mature trees were included within the model.

A review of consented schemes in the surrounding area was undertaken. No active consents were found of sufficient proximity to the site or scale to impact wind conditions around the site. As such, a separate cumulative assessment was not undertaken.

The balcony balustrade treatments (as shown in the submitted design) for the balconies at the corners of the tower were developed to inhibit the wind onto these balconies, and are treated as embedded wind mitigation measures.

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 wind safety risks within the site or 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) are suitable for either sitting or standing in all seasons. This is suitable for the intended use.

Conditions for the bus stops on Avenue Road and Finchley Road (marked "B" in results figures) are suitable for either sitting or standing in all seasons. This is suitable for the intended use.

Conditions for the Farmers Market (marked "FM" in results figures) are suitable for sitting in all seasons. This is suitable for the intended use.

Conditions for the existing amenity to the south and east of the site (marked "A" in results figures) are suitable for a mix of sitting and standing in all seasons will the majority of the space suitable for sitting in summer. This is suitable for the intended use.

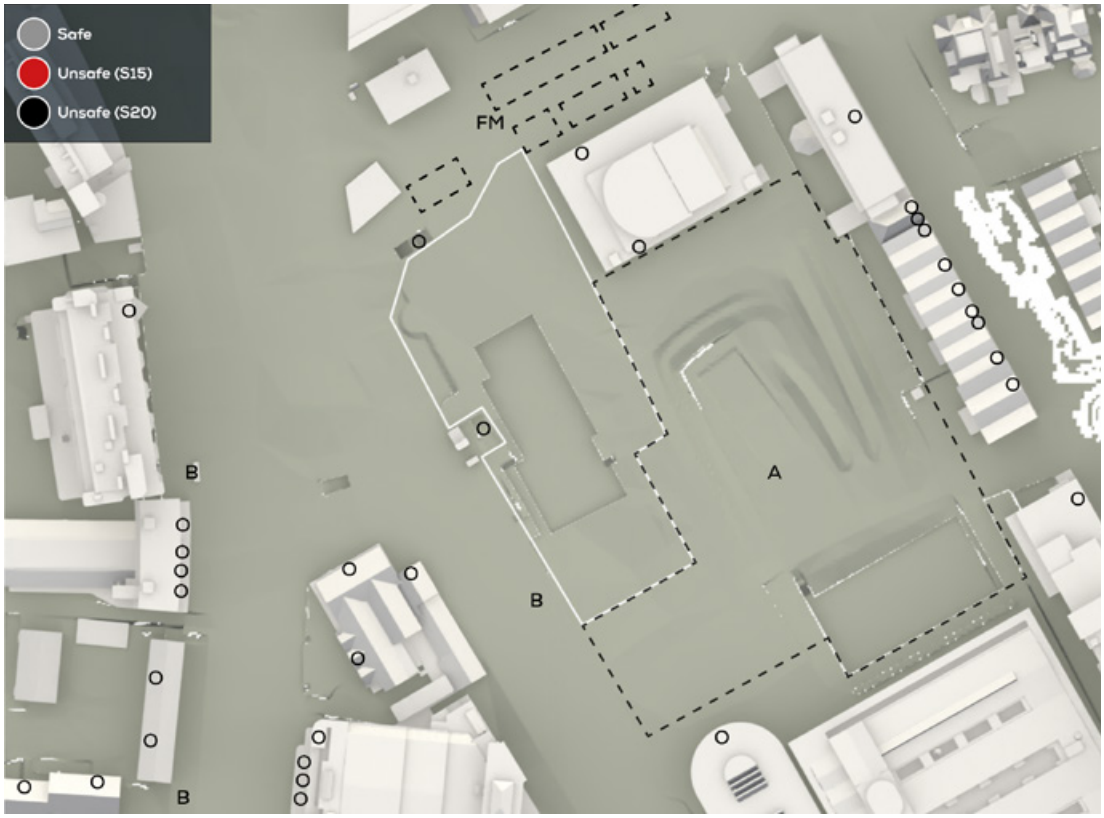


Fig. 04: Annual Safety, Existing Site with Existing Surrounds (Baseline)

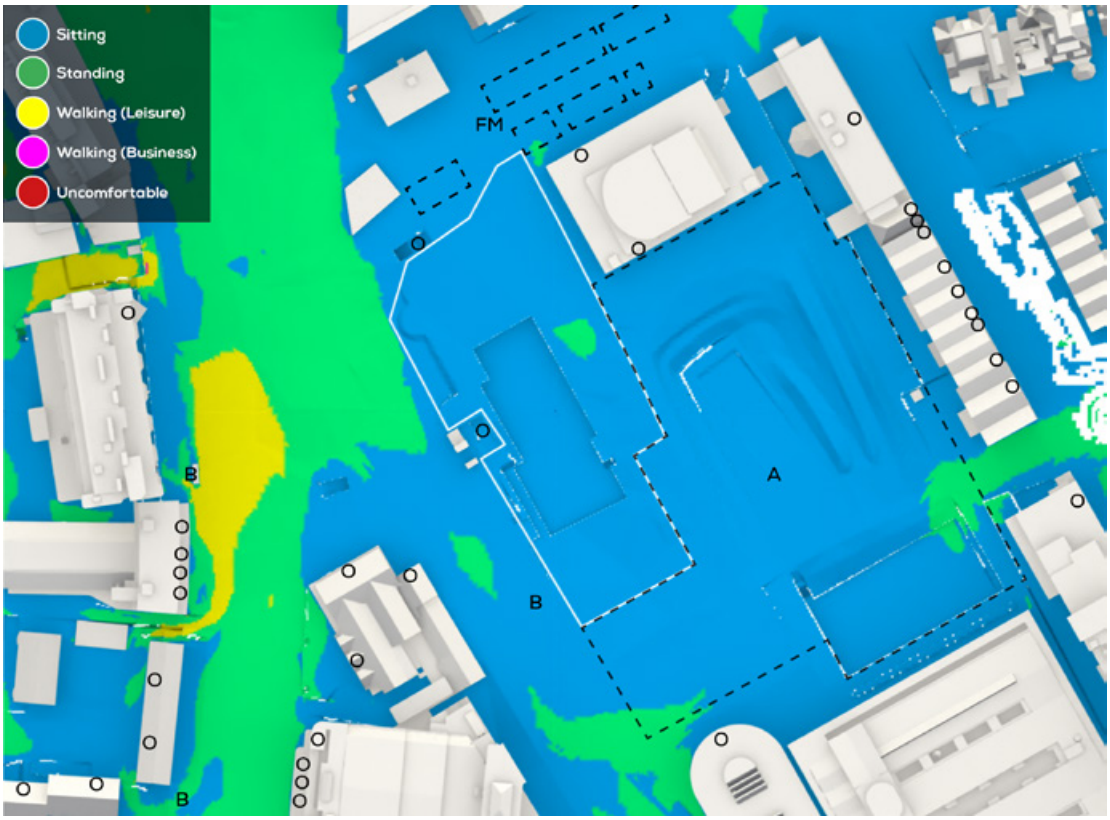


Fig. 05: Winter Comfort, Existing Site with Existing Surrounds (Baseline)

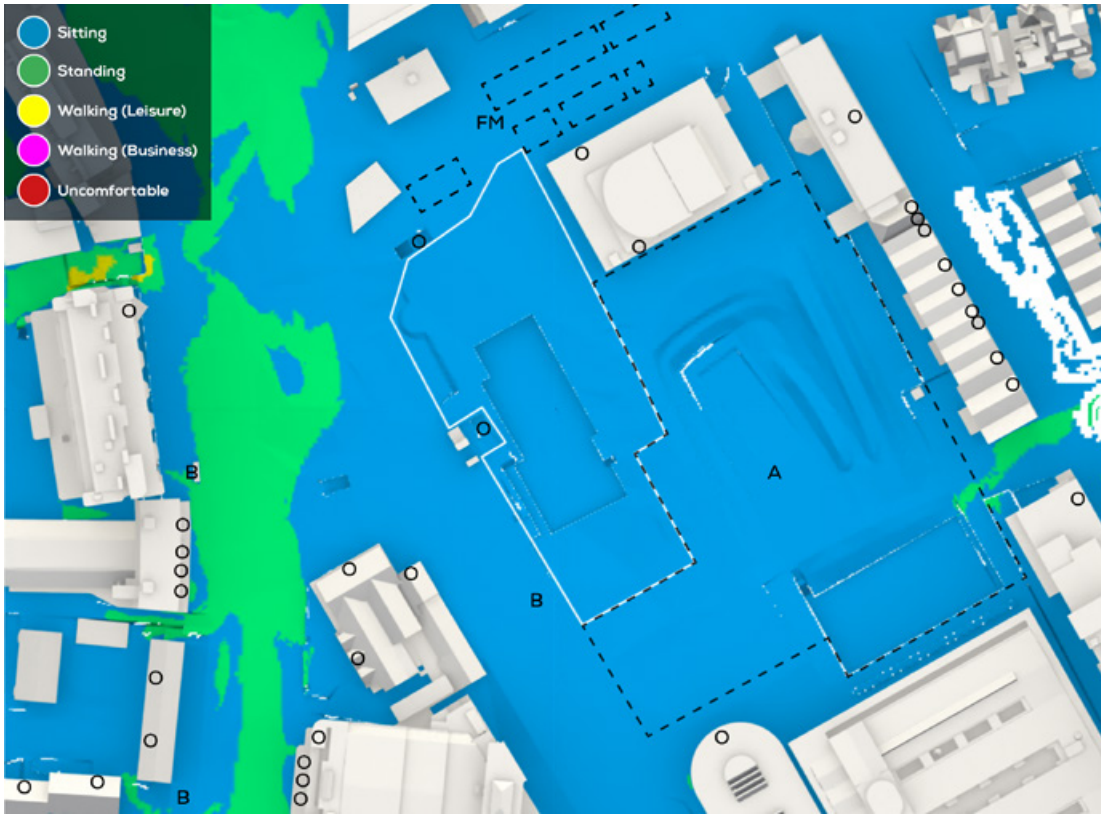


Fig. 06: Summer Comfort, Existing Site with Existing Surrounds (Baseline)

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 wind safety risks within the site or surrounding area.

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

Conditions for the principal proposed entrances to the development (marked "E" in results figures) range between being suitable for sitting and standing in the all seasons. This is suitable for the intended use.

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

Conditions for the bus stops on Finchley and Avenue Road (marked "B" in results figures) are suitable for either sitting or standing in all seasons. This is suitable for the intended use.

Conditions for Farmers Markets (marked "FM" in results figures) are generally suitable for a mix of sitting and standing in winter and for sitting in summer. There is a small region at the west of the westernmost stall which is suitable for leisure walking in winter, but this is not sufficiently extensive to impact the usability of the space (and also within a region which was suitable for leisure walking for the wind assessment submitted with the Implemented Permission). This is suitable for the intended use.

Conditions for the existing amenity to the south and east of the site (marked "A" in results figures) are suitable for a mix of sitting and standing in all seasons will the majority of the space suitable for sitting in summer. This is suitable for the intended use

Elevated Level Conditions

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

There are no wind safety risks identified on the level 6 terrace and conditions for the terrace are suitable for sitting in all seasons. This is suitable for the intended use.

The balconies are not subject to any significant safety exceedances and are suitable for sitting or standing in summer. This is suitable for the intended use.

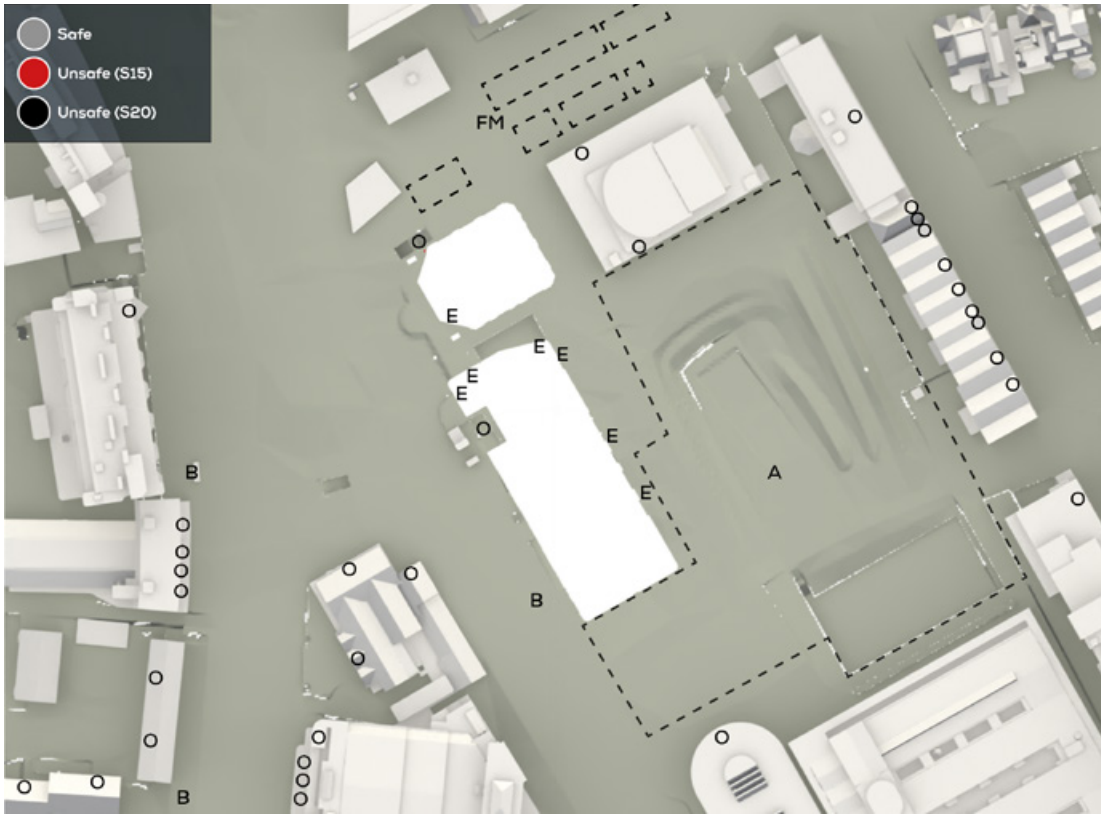


Fig. 07: Annual Safety, Proposed Development with Existing Surrounds

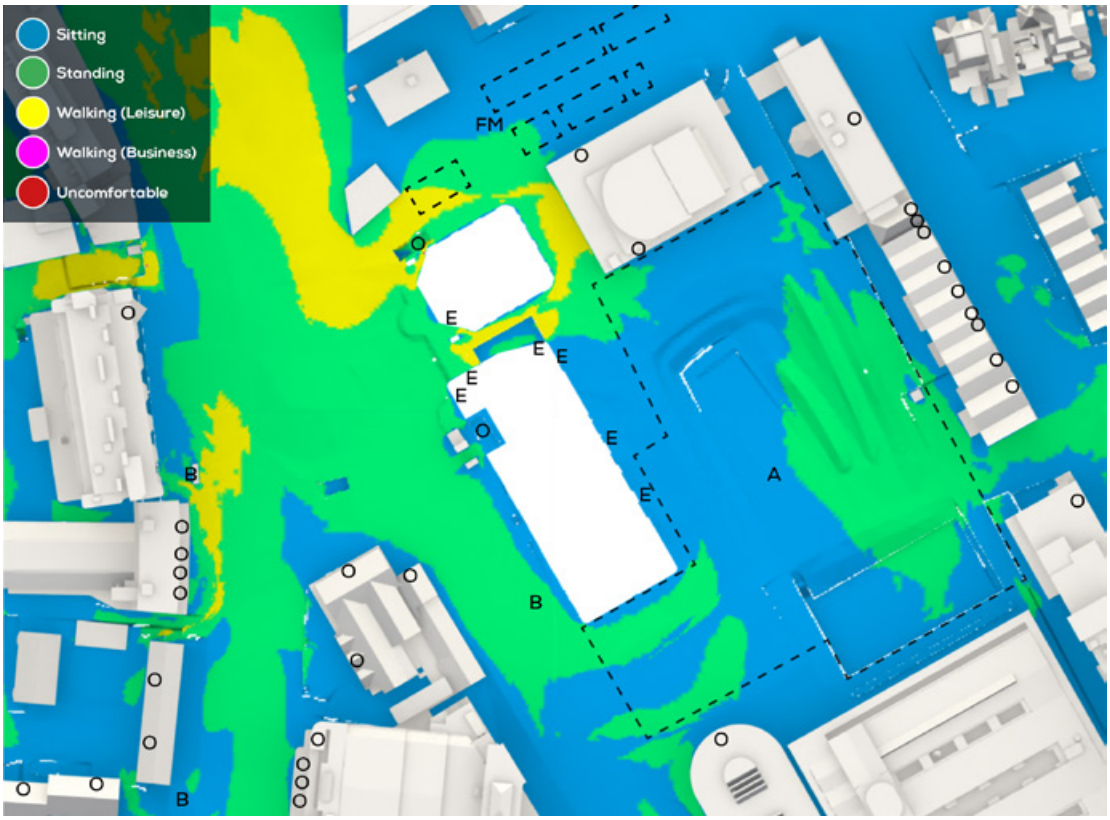


Fig. 08: Winter Comfort, Proposed Development with Existing Surrounds

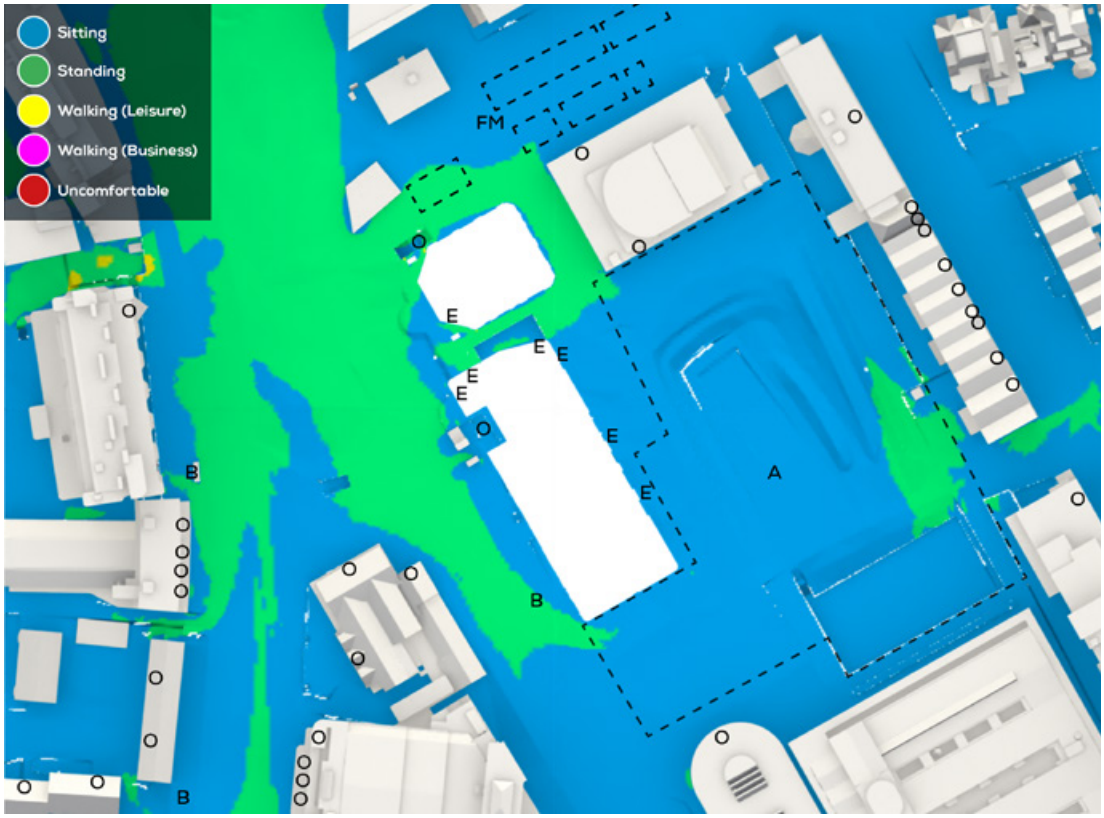


Fig. 09: Summer Comfort, Proposed Development with Existing Surrounds

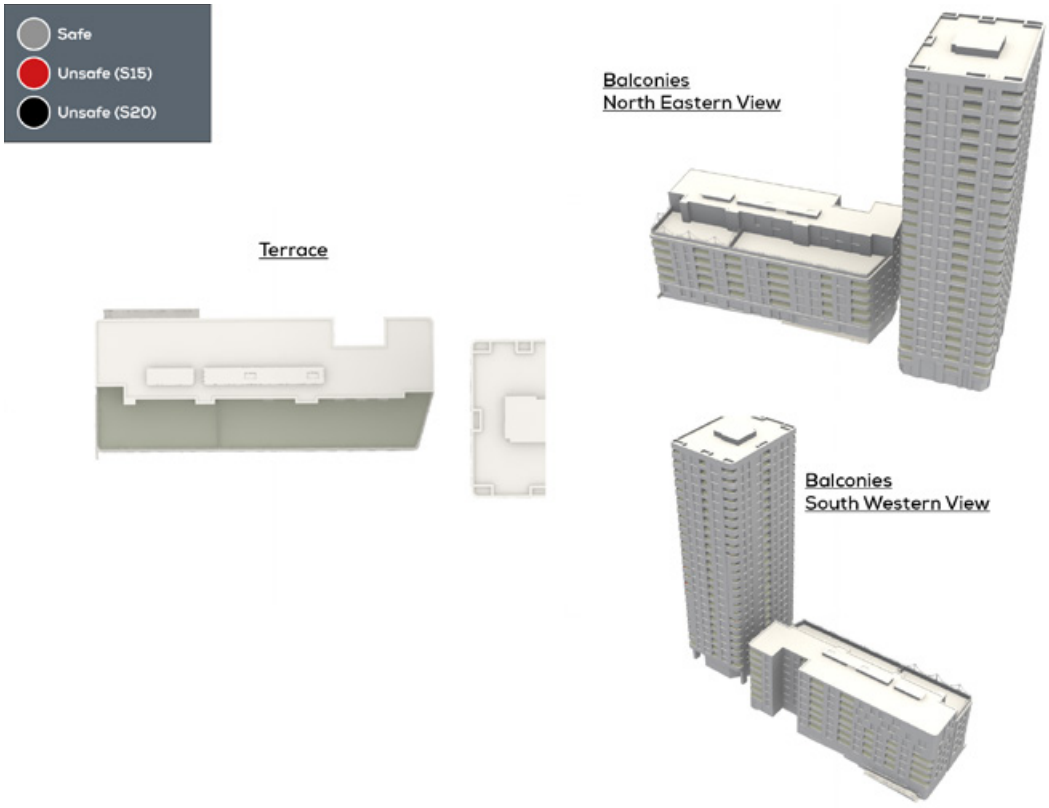


Fig. 10: Annual Safety at Elevated Levels, Proposed Development with Existing Surrounds

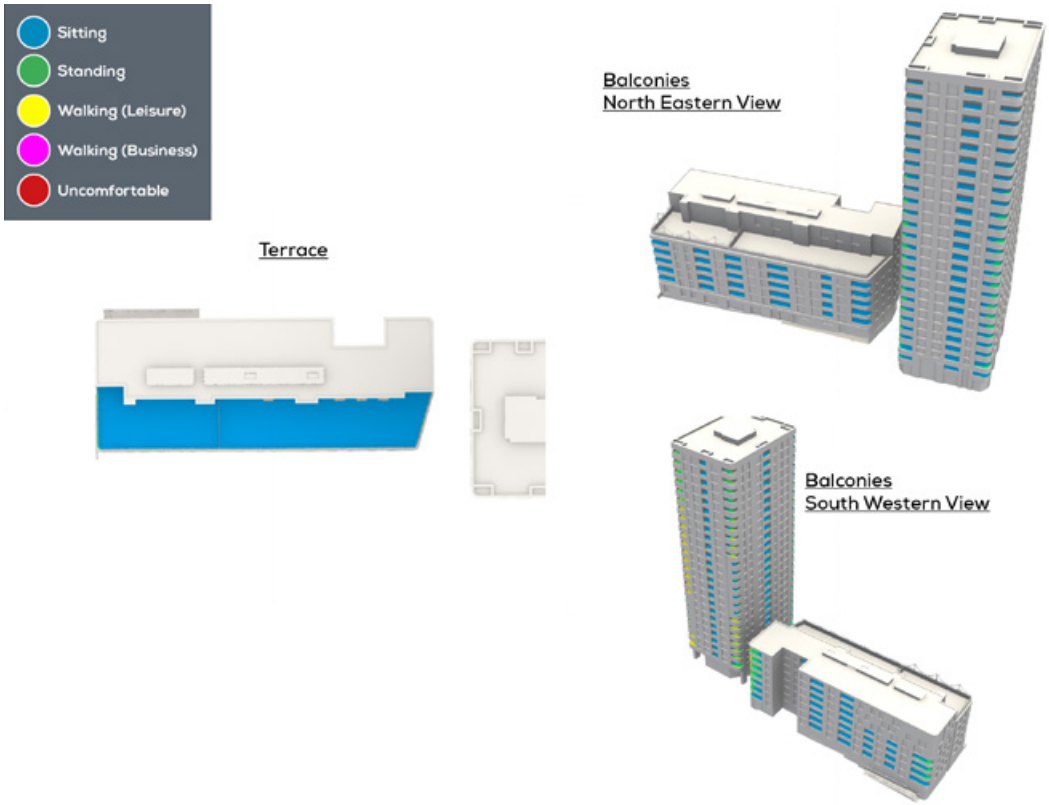


Fig. 11: Winter Comfort at Elevated Levels, Proposed Development with Existing Surrounds

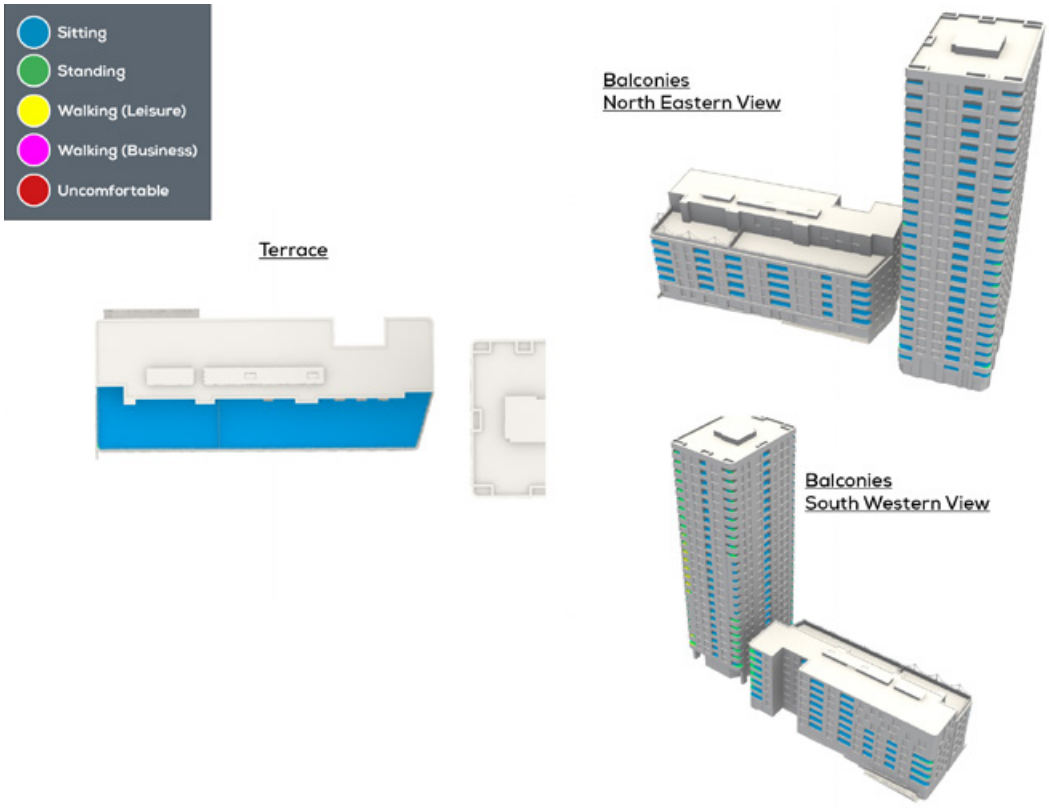


Fig. 12: Summer Comfort at Elevated Levels, Proposed Development with Existing Surrounds

4 CONCLUSIONS

Wind microclimate conditions for the proposed development at 100 Avenue Road were assessed using high resolution Computational Fluid Dynamics (CFD).

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

Wind comfort conditions would be suitable for all intended uses (or no worse than the baseline conditions) for all thoroughfares, roadways, proposed or existing building entrances, bus stops, the stalls of Swiss Cottage Farmers Markets, existing amenity spaces, the proposed level 6 terrace and the proposed balconies.

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 94 and 106 million cells. Mesh detail is shown in Figure 13 and Figure 14.

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 form 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 London Heathrow and City airports combined are shown in n Figure 15.

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 Item01008 '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 16.

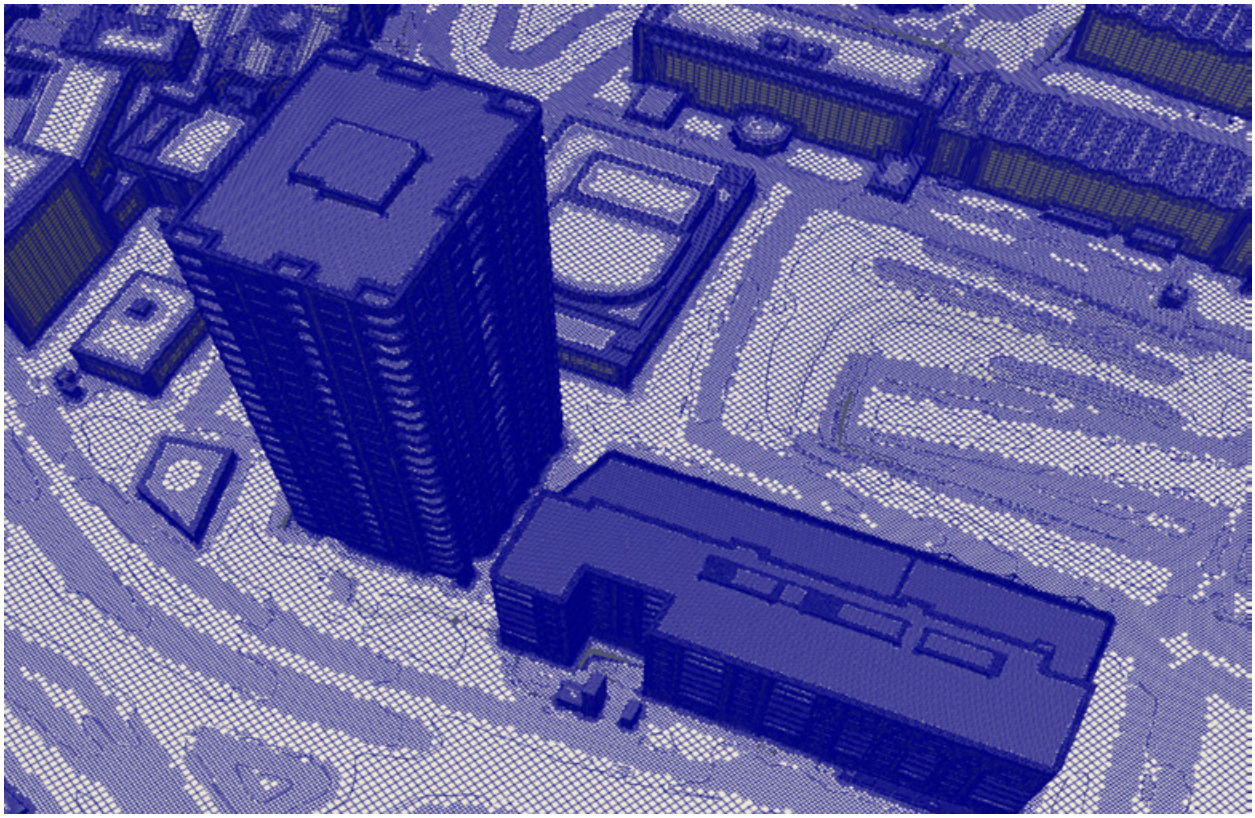


Fig. 13: Mesh Detail on Site Buildings

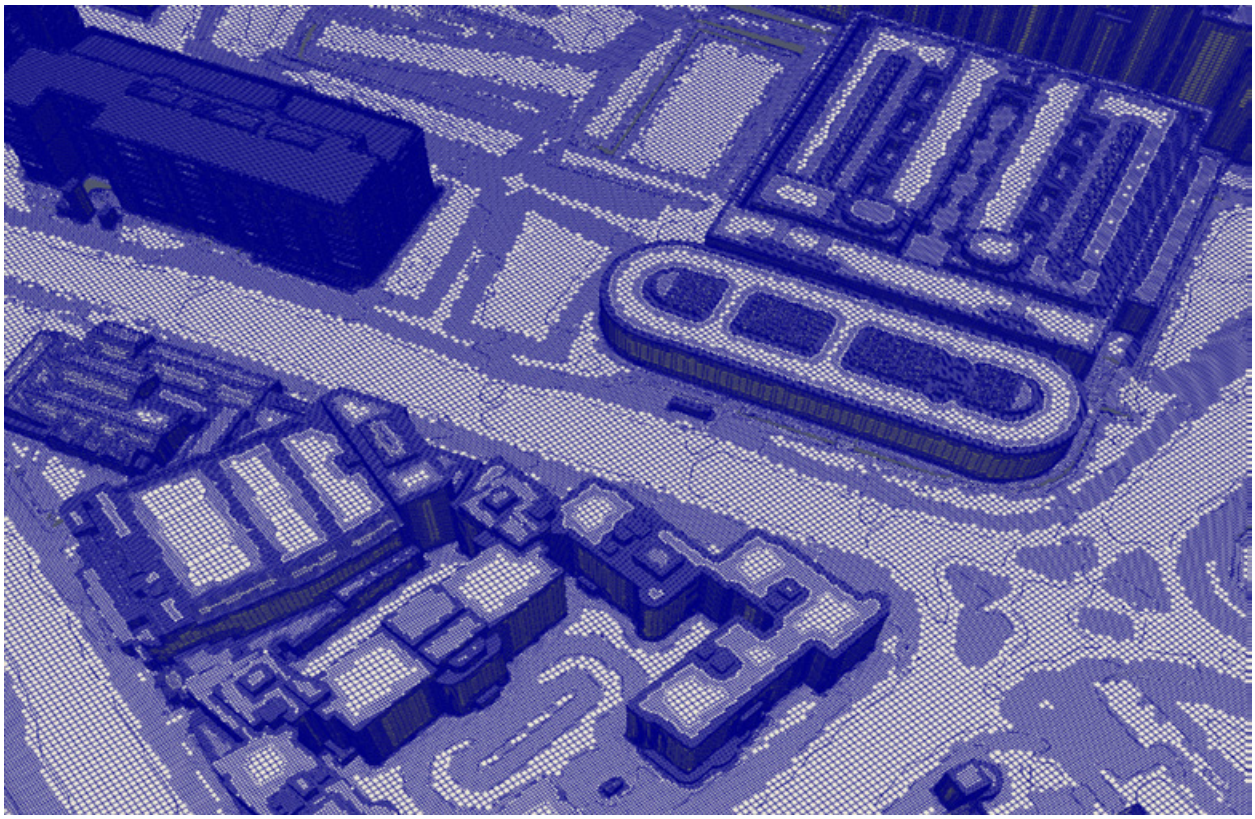


Fig. 14: Mesh Detail on Surrounds

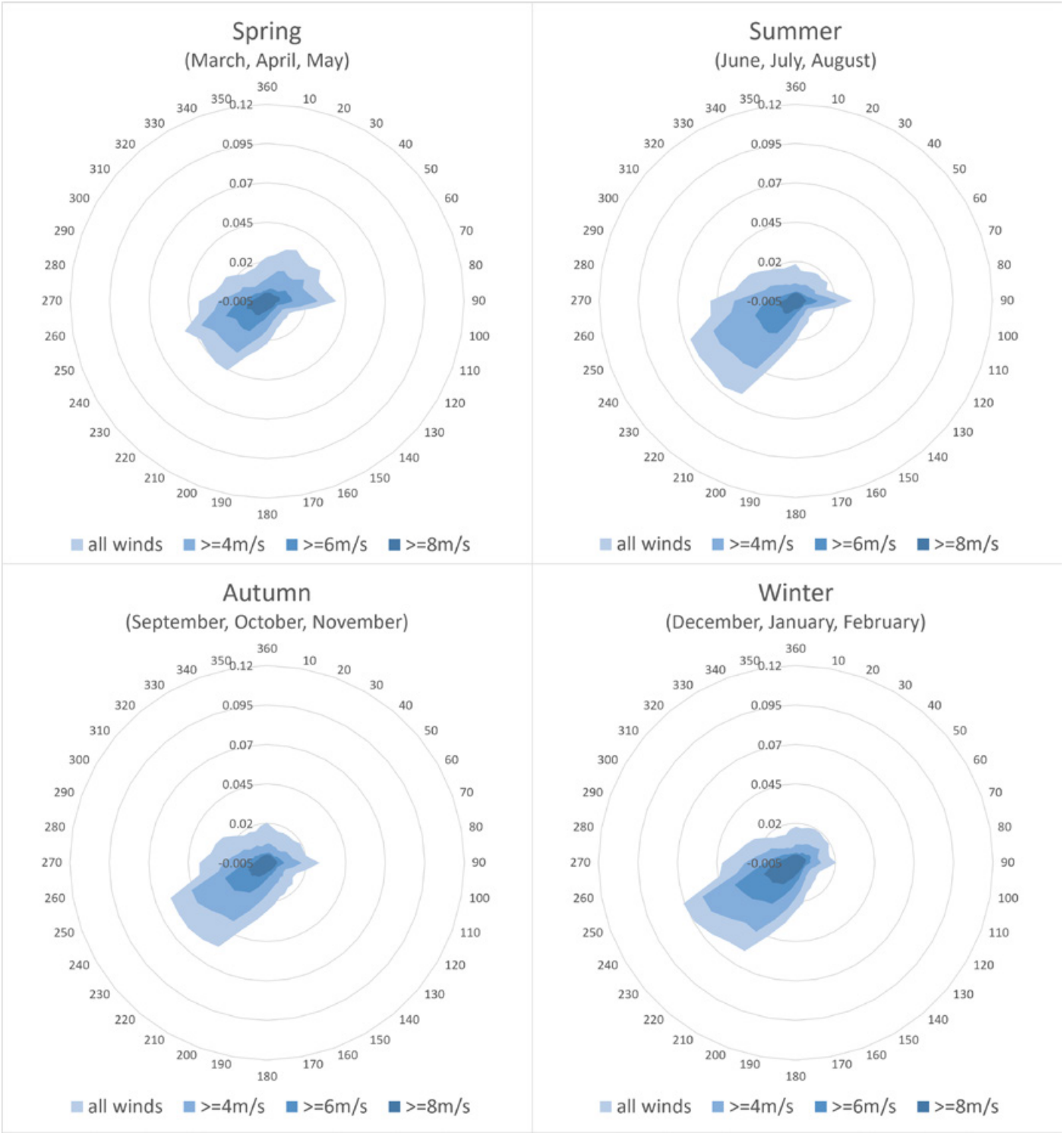


Fig. 15: Seasonal Wind Roses for London (Combined)

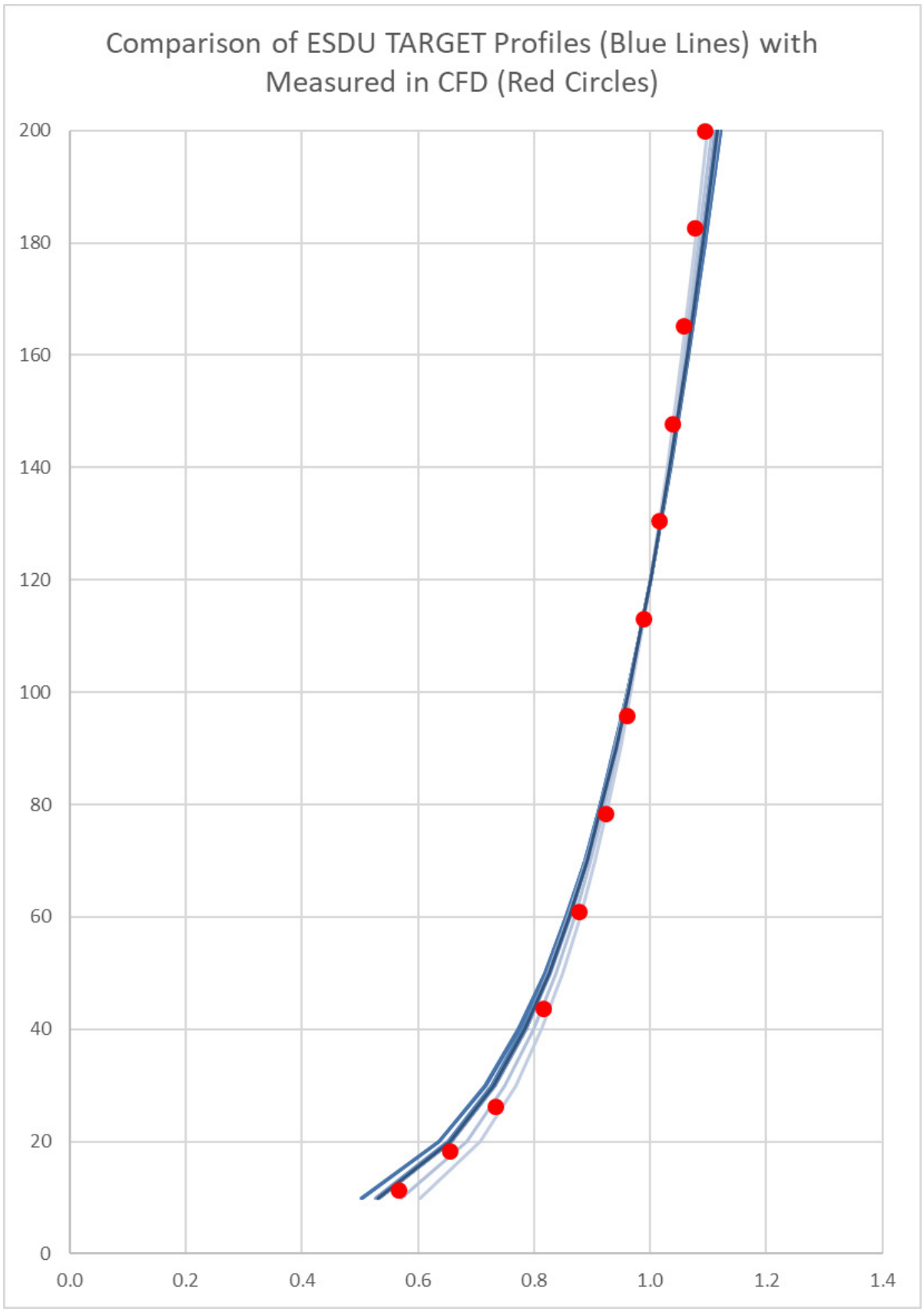


Fig. 16: Wind Profile for Avenue Road

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What we do:

Building Surveying
Daylight & Sunlight
Light Obstruction Notices
Measured Surveys
Party Wall & Neighbourly Matters
Rights of Light
Solar PV
Wind Analysis

Where we are:

Belfast
Birmingham
Bristol
Dublin
London
Manchester

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