

Assessing Wind Microclimate for Planning Applications

Property development company Barberry tasked Wilde’s CFD team with assessing and identifying wind microclimate around and within the proposed development of Bishop Gate, one of the largest single-phase purpose-built student schemes in the Midlands, if not the UK. The assessment confirmed that the site was safe, enabling Barberry to not only fulfil the planning requirements, but also to ensure that the final design promotes the comfort and safety of pedestrians within the development.

Company

Since 1983, Barberry has established itself as one of the most successful privately-owned property development and investment companies in the West Midlands. Their current portfolio comprises a range of developments across all property sectors and UK-wide – from industrial, residential and offices to retail and leisure.

Background

Barberry is involved in the development of Bishop Gate, a 2-acre former Royal Mail sorting office site based in the heart of Coventry city centre. The scheme will involve building five tower blocks rising to 17 storeys, to accommodate more than 1100 Coventry University students.

The development will have multi-use courtyards and gardens, plus a frontage on to two main streets, including retail units open to the public.

“” The wind assessment was necessary for the planning application but it did also influence the design of the scheme. This is a **substantial city-centre scheme**, comprising five towers, two of which are 50m high. The **wind analysis is therefore important**, and it will make a difference to people walking around and moving in and out of the building.



Fig. 1: Bishop Gate – proposed development (Courtesy: Barberry)

Challenge

In order to meet planning requirements for pedestrian comfort and safety, Barberry asked Wilde to carry out an assessment study to identify wind microclimate around and within the proposed development Bishop Gate.

Solution

Wilde’s CFD consultants carried out the wind assessment using computational fluid dynamics (CFD). Simulations were run using **ANSYS CFX**, while geometry preparation, based on CAD provided by Barberry, was carried out using **ANSYS SpaceClaim DirectModeler**.

The assessment considered wind from each of the twelve equi-spaced directions. Boundary conditions

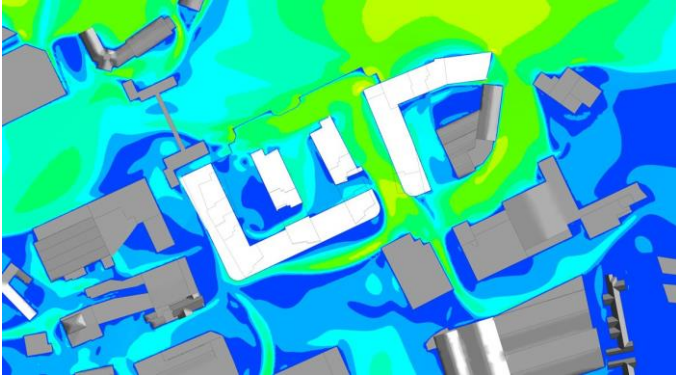


Fig. 2: Example of contour plot of wind speed
(Courtesy: Barberrry)

were determined from site-specific data on the statistical distribution of wind speed and direction. This enabled a comparison with the Lawson criteria for pedestrian comfort and safety. Contour plots of wind speed at pedestrian level for each of these reference conditions provide a detailed picture of the wind microclimate when the wind is in each of these twelve directions.

Pedestrian comfort and safety were evaluated in and around the proposed mixed-use development site. Contour plots of comfort and safety were produced for both configurations (i.e. with and without the development) allowing a quantitative assessment of the impact of the scheme.

Business Benefits

The site was assessed as safe. The model highlighted a comfort issue in one area of the design and made recommendations for measures to mitigate wind impacts and further improve conditions there.

“” While the wind report was needed for planning, it was also **very important** to us to ensure that the design factored in the **wind analysis to promote people’s comfort and safety** within this development. This is an important factor which is too often slightly overlooked at early stages of planning and design.

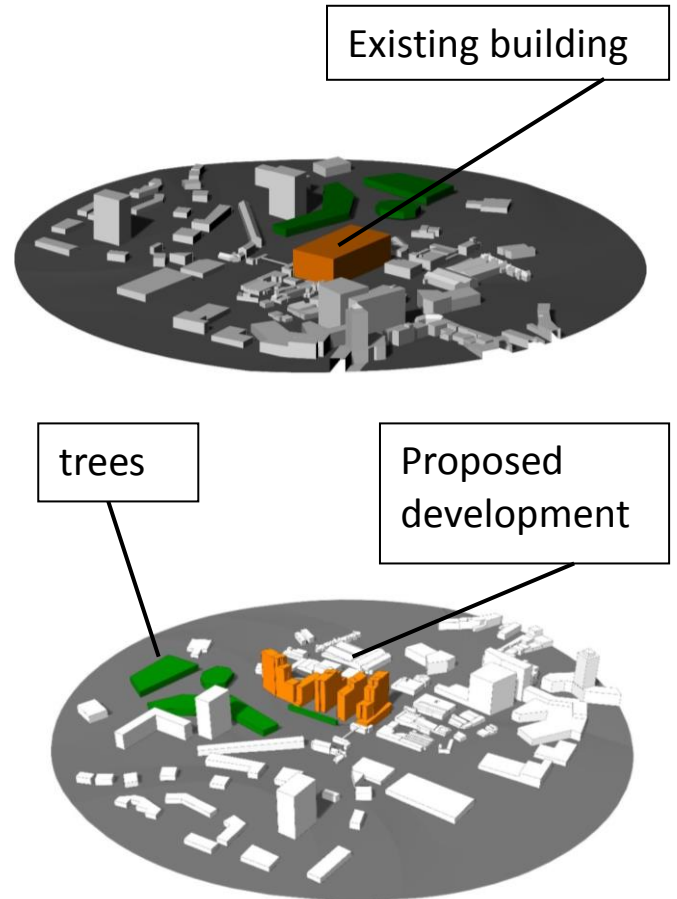


Fig. 3a: CFD Model – Existing conditions;
Fig. 3b: CFD solution domain geometry (Courtesy: Barberrry)