



DESKTOP WIND MICROCLIMATE STUDY

68-70 Oldham Street, Manchester

03 August 2022

GIA No: 1896

PROJECT DATA:

Client **Jadebricks Manchester Limited**
Project Title **68-70 Oldham Street, Manchester**
Project Number **1896**

REPORT DATA:

Report Title **Desktop Wind Microclimate Study**
GIA Department **Wind & Microclimate**
Dated **03 August 2022**
Report Number **1896**
Prepared by **JW**
Checked by **CH**
Type **Client Issue**

Revisions	No:	Date:	Notes:	Signed:

SOURCES OF INFORMATION:

Site Photos **GIA**
3D models **VERTEX & VUCITY**
OS Data **FIND Maps**



CONTENTS

1 INTRODUCTION	4
1.1 SUMMARY	4
1.2 GUIDANCE	4
2 METHOD	5
2.1 ASSESSMENT METHODOLOGY	5
2.2 SITE GEOMETRY	5
2.3 WIND DATA ANALYSIS	5
2.4 TARGET CONDITIONS	10
2.5 LIMITATIONS & ASSUMPTIONS	10
3 RESULTS	11
3.1 DOMINANT WIND ANGLE (SSW)	11
3.2 SECOND DOMINANT WIND ANGLE (W)	11
3.3 SPRING DOMINANT WIND ANGLE (NE)	11
4 CONCLUSIONS	14

1 INTRODUCTION

This report outlines the results of a desktop wind microclimate analysis to inform a full planning application for the development of 68-70 Oldham Street, Manchester.

1.1 SUMMARY

Potential wind effects were assessed for 68-70 Oldham Street, Manchester.

Consideration was given to the potential impact of the proposed development on local thoroughfares, proposed amenity spaces and building entrances.

Various potential risk factors for raised wind speeds were considered.

There is not considered to be a significant risk of raise wind speeds at ground level due to the proposed development.

As such, general thoroughfares and building entrances are expected to be suitable for the intended use.

There is a risk of some slightly raised wind speeds for the proposed roof terrace amenity, which may make it unsuitable for calmer activities such as long term sitting. This could be effectively mitigated either through raised balustrades or screening.

1.2 GUIDANCE

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”

Greater Manchester Joint Development Plan

The Greater Manchester Combined Authority Joint Development Plan, ‘Places for Everyone’ was published in 2021.

‘Policy JP-P-1 Sustainable Places’ states that “all development [...] should be consistent with: [...] comfortable and inviting, with indoor and outdoor environments: [...] addressing microclimate issues such as sunlight, indoor air quality, overheating, shade, wind and shelter”.

Assessment Criteria

The assessment was performed with reference to the 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.

2 METHOD

2.1 ASSESSMENT METHODOLOGY

The assessment was performed as a desktop study, combining analysis of wind data from a local weather station with qualified assessment of any likely effects that the development may have on local wind conditions.

The assessment was performed by an experienced wind engineer with 10 years specific experience of performing wind microclimate studies.

The most common effects that a development could have on local wind conditions are as follows:

- Downwash:
 - High speed airflow from higher in the earth boundary layer being directed down to ground level by a building face.
- Corner flows:
 - Acceleration of the airflow due to the large pressure gradients around sharp corners.
- Channelling:
 - Acceleration of the airflow due to the flow paths being constrained between multiple buildings.

2.2 SITE GEOMETRY

A 3D CAD model of the proposed development was used for the analysis, which is shown in Figure 4.

The site is located within a dense urban setting of low to medium rise commercial and residential unit. The surrounding area is shown in Figure 5.

2.3 WIND DATA ANALYSIS

30 years of wind data were obtained for Manchester International airport. The location of the site relative to the airport is shown in Figure 6.

Seasonal wind roses were created for the weather station. These are shown in Figure 7.

The dominant wind direction is south-south-westerly.

There is also a secondary dominant wind direction from the west, and from the north east during the spring.

The dominant wind direction for high wind speeds (hourly wind speeds >8m/s at 10m height at the airport) is 190°, stronger winds are most likely to occur in winter.

There are also significant high wind speeds from 280°.

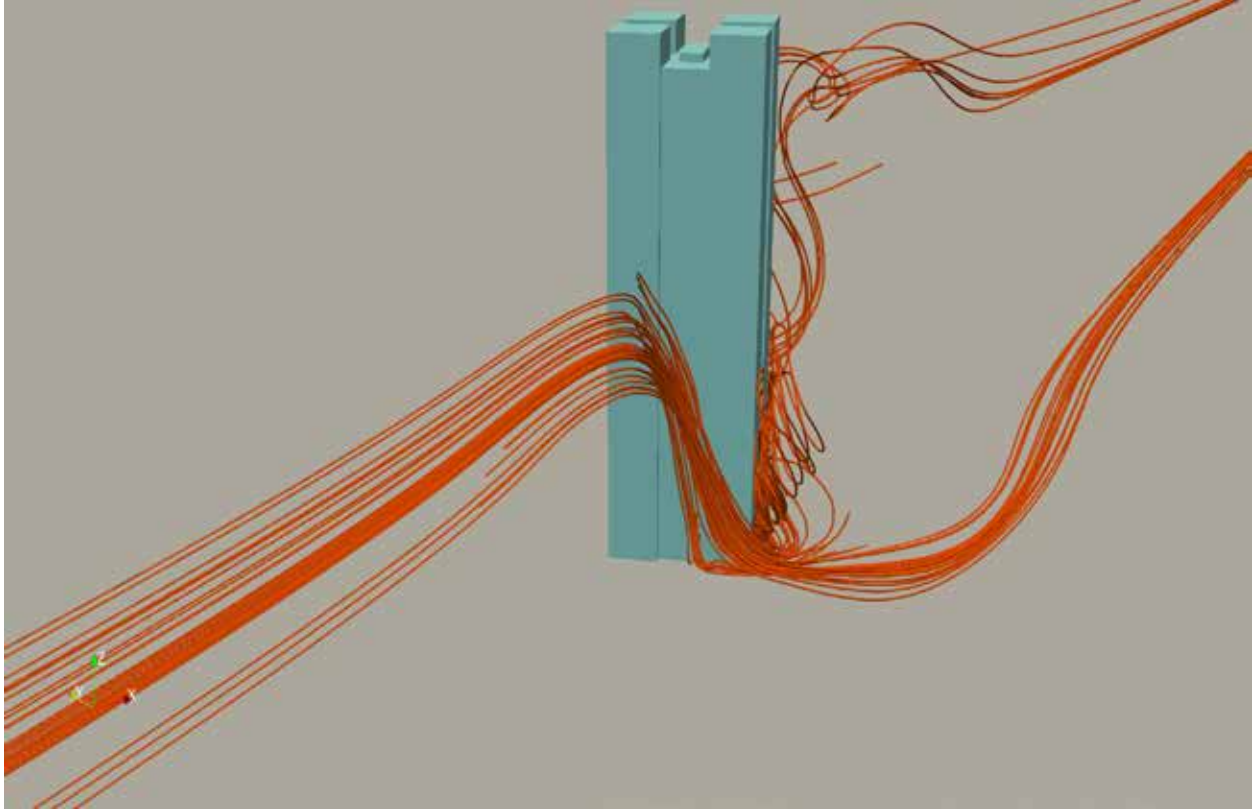


Fig. 01: Downwash

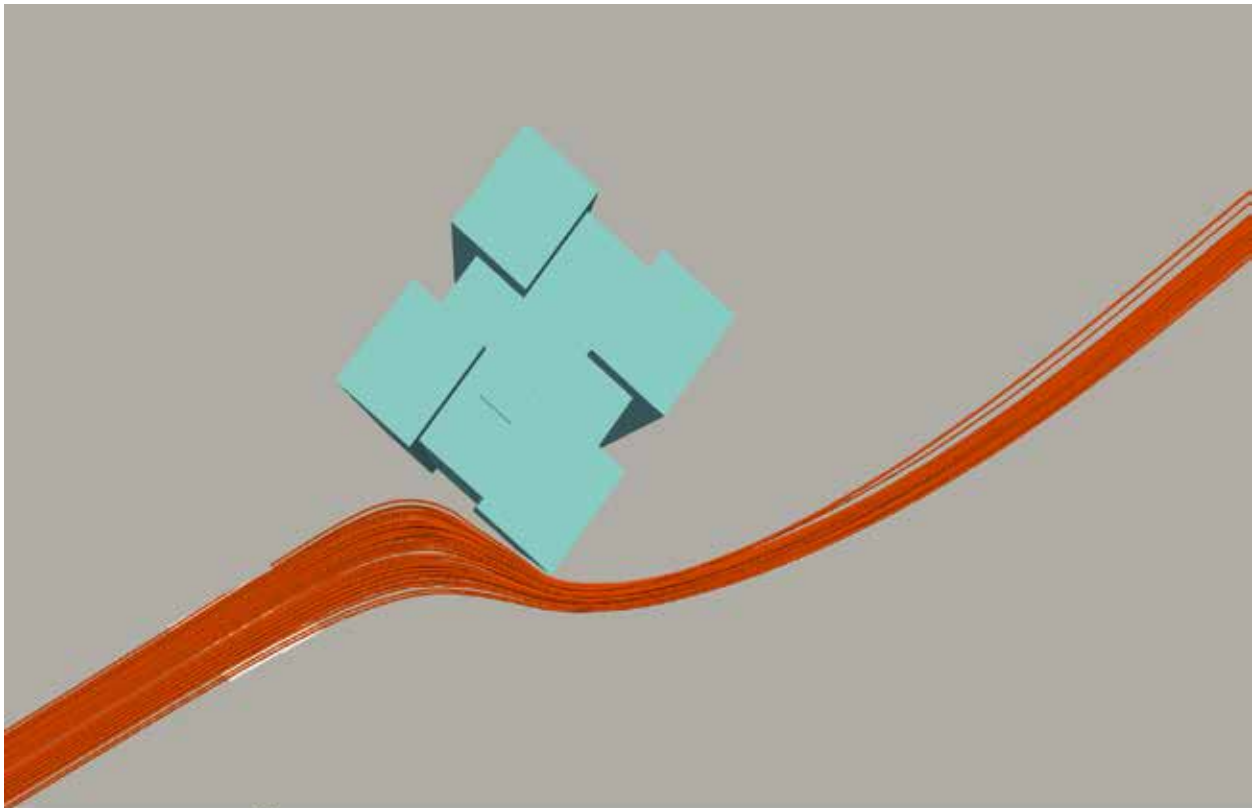


Fig. 02: Corner Flows

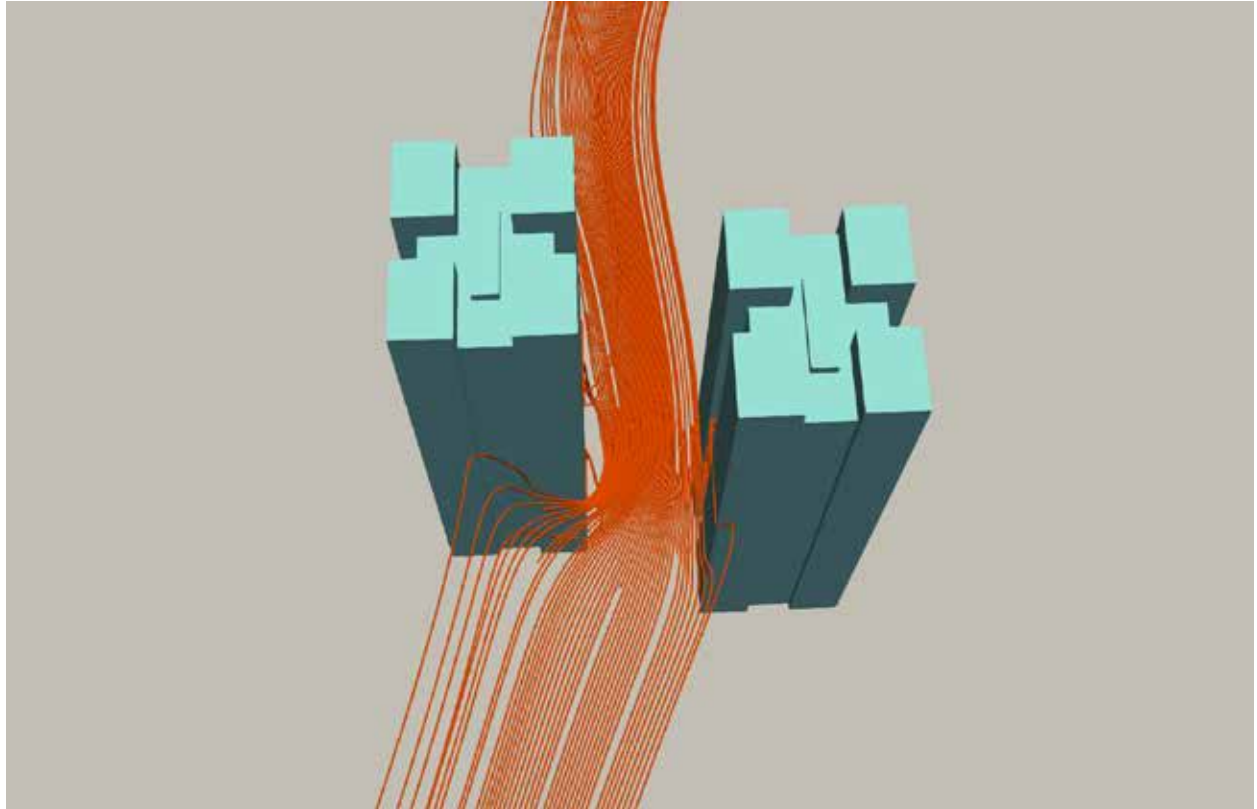


Fig. 03: Channelling



Fig. 04: The Proposed Development (3D view)



Fig. 06: Surrounding Area

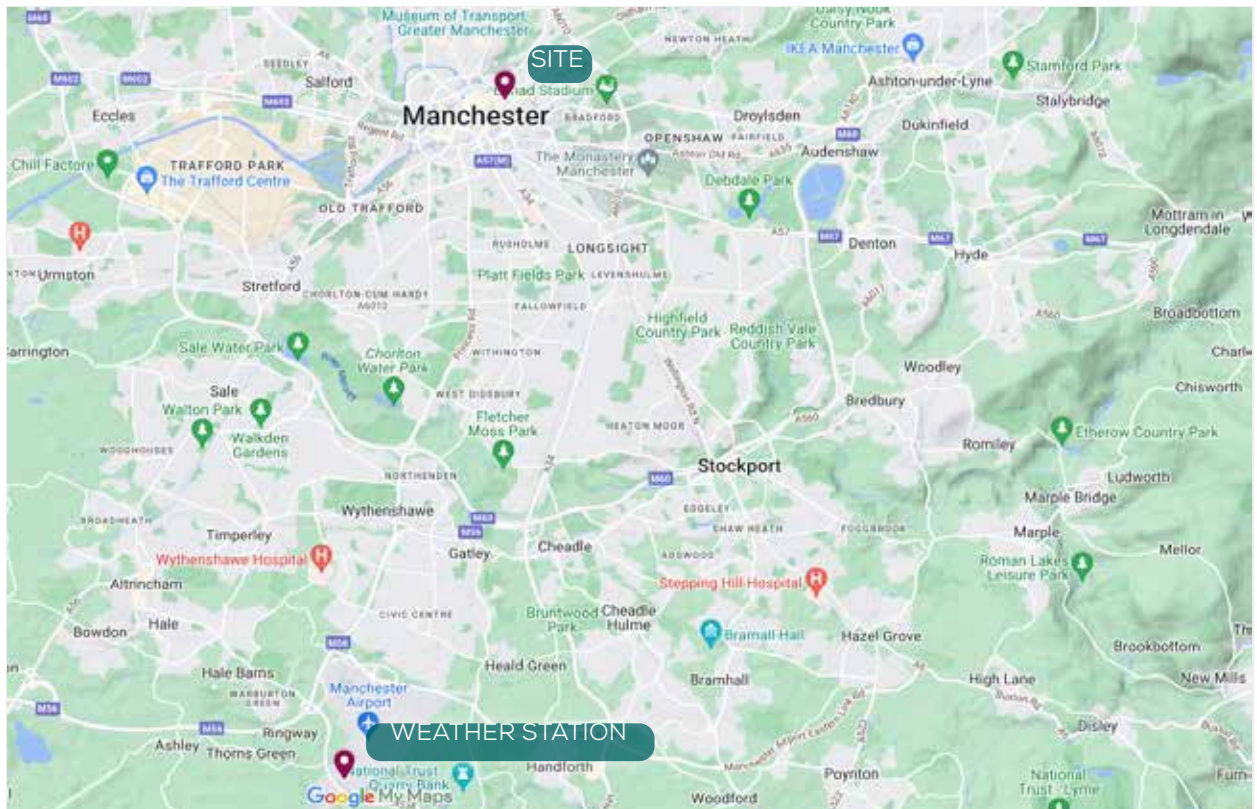


Fig. 05: Relative Locations of Site and Weather Stations

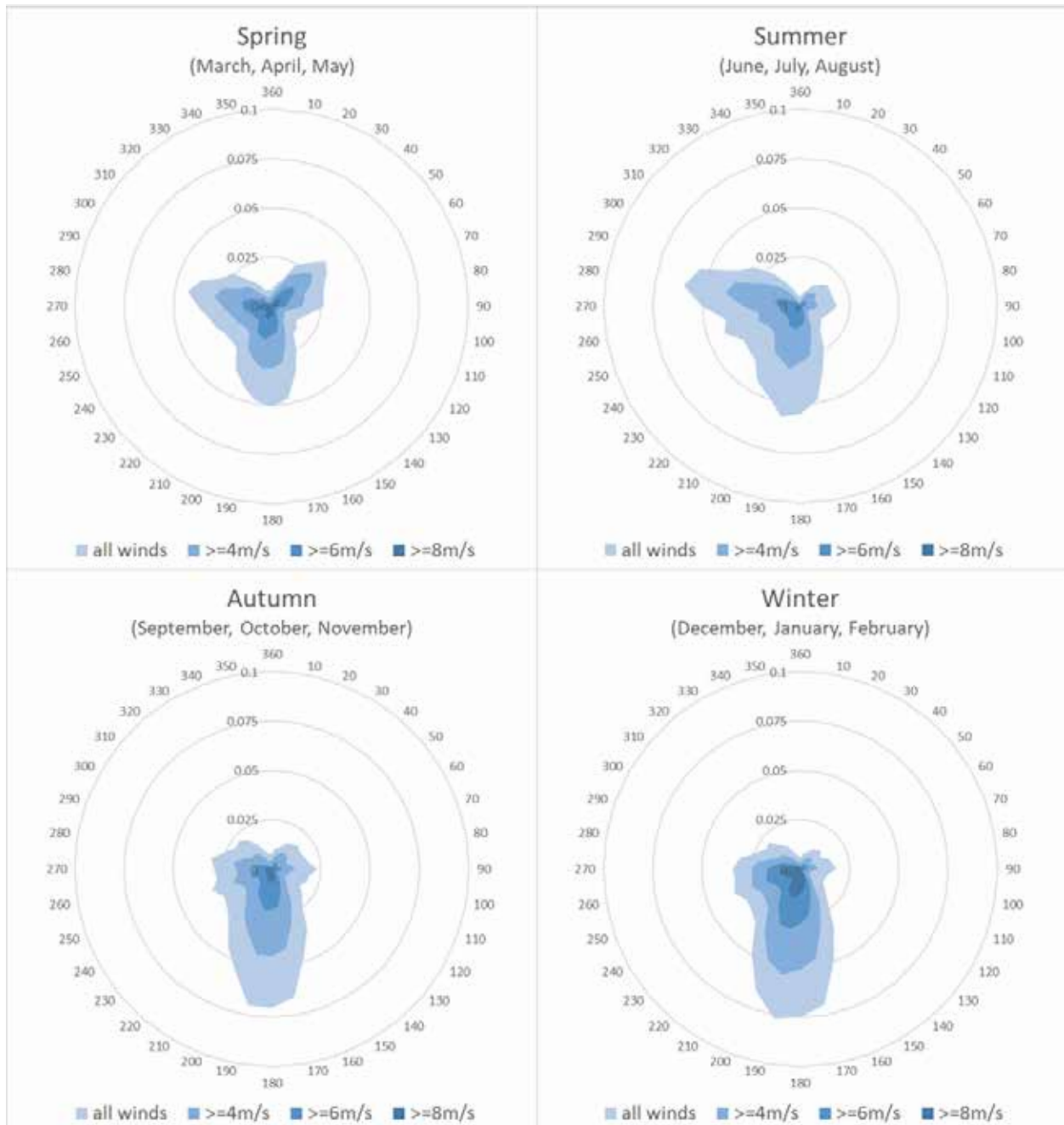


Fig. 07: Wind Roses for Manchester International Airport (1991-2021)

2.4 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 are predicted to be 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 Development.

Any amenity spaces should be suitable for leisure walking in the winter, and for a mixture of sitting and standing in the summer.

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.

2.5 LIMITATIONS & ASSUMPTIONS

This study is a desktop study. This means it does not include any modelling of the actual airflow around the site. Hence any atypical local microclimatic features will not be captured.

The nature of a desktop study means that all results and conclusions are qualitative, and it is not possible to draw quantitative conclusions.

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)
	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 (0.022% 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

3 RESULTS

3.1 DOMINANT WIND ANGLE (SSW)

Figure 8 shows a plan view of the proposed development, with the key wind angles highlighted.

It is apparent that, from the dominant south south westerly wind angle, the orientation of the building is such that the building corners are facing the wind, rather than a flat face. As such, the building orientation will help reduce the risk of downwash from this angle.

Figure 9 shows the proposed development viewed from the dominant wind angle (south south westerly), with certain key features with regards to wind microclimate highlighted.

While the proposed development is taller than those buildings which are immediately upwind, significant protection is afforded by the Hive building to the south of the site. This limits the amount of the building which is exposed to the wind and further reduces the risk of downwash.

The southern face of the proposed development (marked A in Figure 9) is more exposed to the dominant wind angle. Any downwash from this face, however, would be disrupted by the roof of the neighbouring 66 Oldham Street building and would not be expected to cause significantly raised wind speed at ground level.

The roof terraces in the proposed development are exposed to the wind at their southern edges from this wind angle (circled yellow in Figure 9). This may cause localised regions of raised wind speeds across the south west corner of these terraces. Either the terraces should be designed to encourage users away from the south west corner, or a taller balustrade or screening could be considered for this edge of the terrace.

3.2 SECOND DOMINANT WIND ANGLE (W)

From Figure 8, it is apparent that, from the second dominant westerly wind angle, the orientation of the building is such that the building corners are facing the wind, rather than a flat face. As such, the building orientation will

help reduce the risk of downwash from this angle.

Figure 10 shows the proposed development viewed from the second dominant wind angle (westerly), with certain key features with regards to wind microclimate highlighted.

For the second dominant winds, the proposed development is more exposed than from other wind directions. The areas for which there is an increased risk of downwash are highlighted in red in Figure 10. For both of these regions, there are adjoining buildings which will break the downwash up before it reaches the ground, and as such would not be expected to cause significantly raised wind speed at ground level.

The roof terraces in the proposed development are exposed to the wind at their western edges from this wind angle (circled yellow in Figure 10). This may cause localised regions of raised wind speeds across the west of these terraces. Either the terraces should be designed to encourage users away from the western edge, or a taller balustrade or screening could be considered for this edge of the terrace.

3.3 SPRING DOMINANT WIND ANGLE (NE)

From Figure 8, it is apparent that, from the spring dominant north easterly wind angle, the orientation of the building is such that the building corners are facing the north eastern facade of the building. As such, the building orientation is a potential risk factor for downwash from this wind angle.

Figure 11 shows the proposed development viewed from the spring dominant wind angle (north easterly), certain key features with regards to wind microclimate highlighted.

From this wind angle, significant protection is afforded by the neighbouring 84-86 Oldham Street Block A. This would be expected to effectively negate the risk of downwash from this wind angle, and significantly raised wind speeds are not expected at ground level.

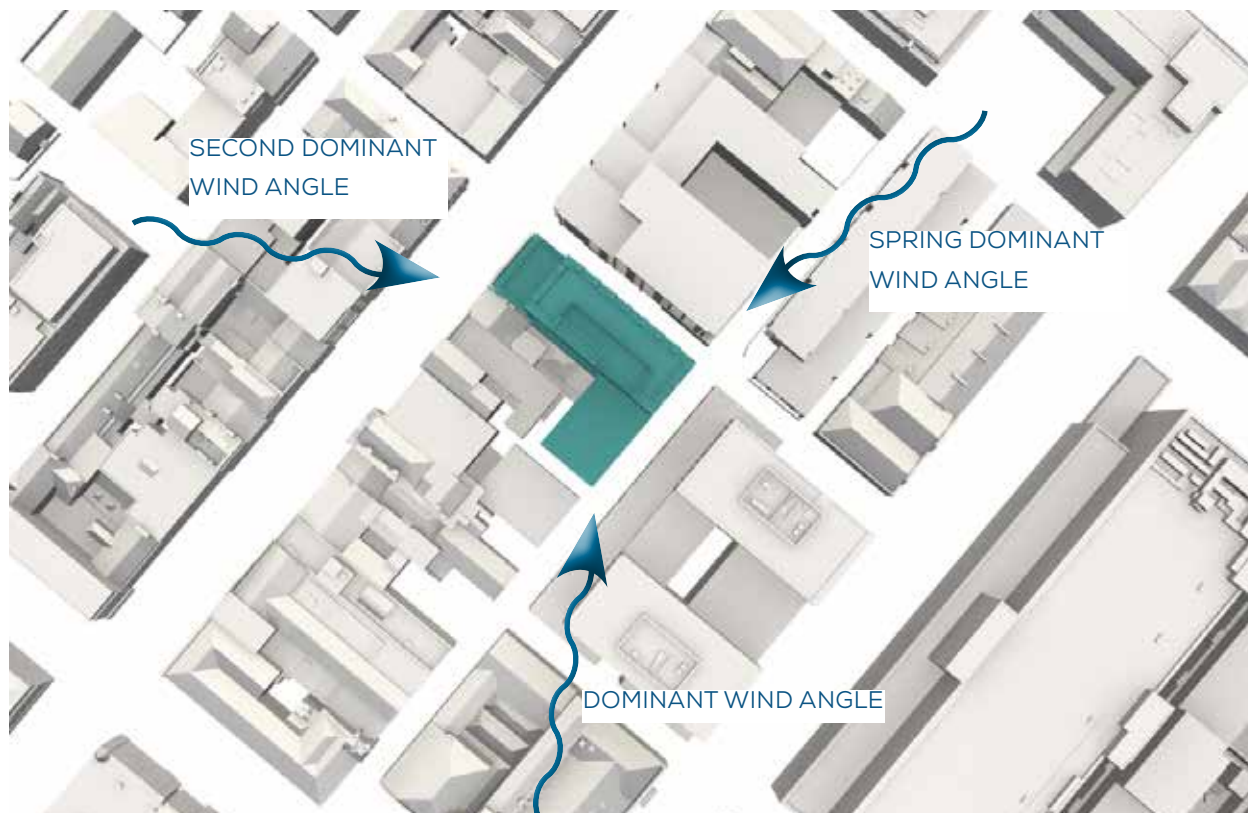


Fig. 08: Plan View of the Proposed Development

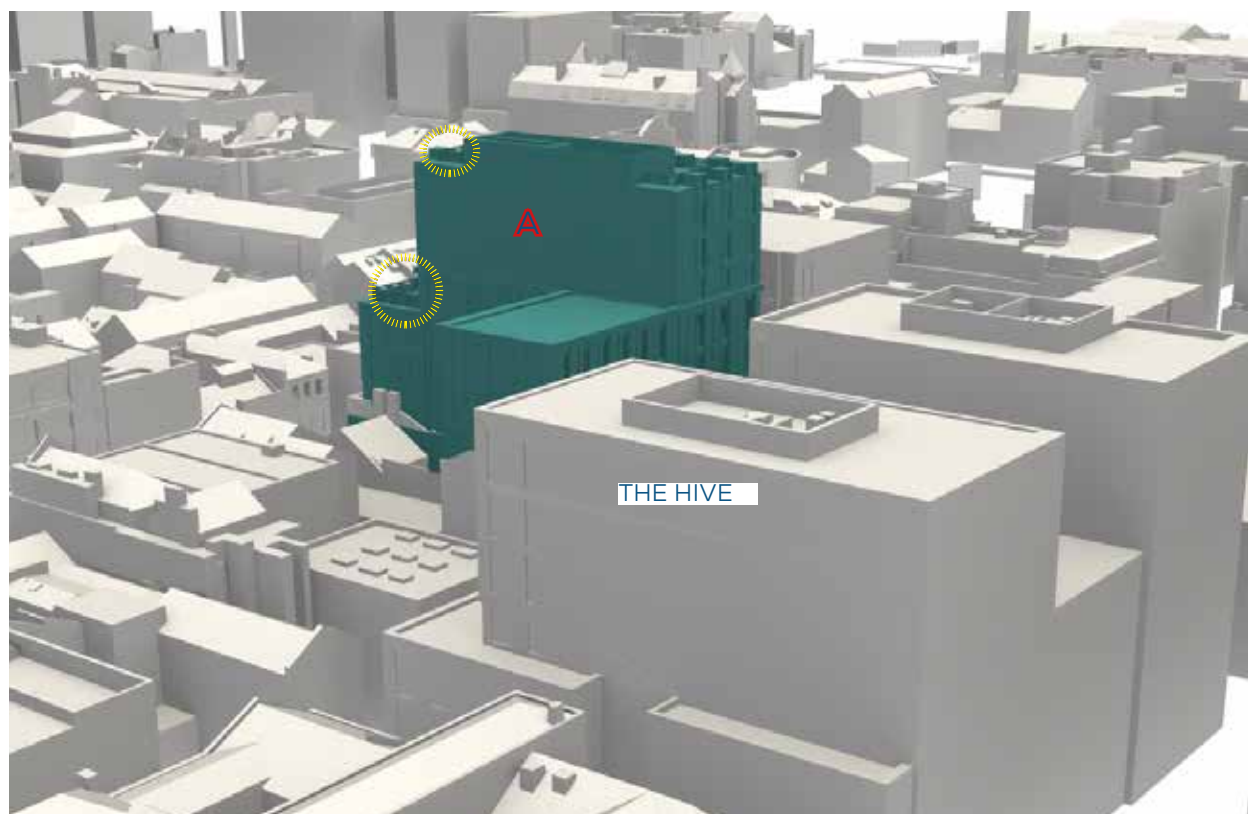


Fig. 09: The Proposed Development, as Viewed from the Dominant Wind Angle (South South West)

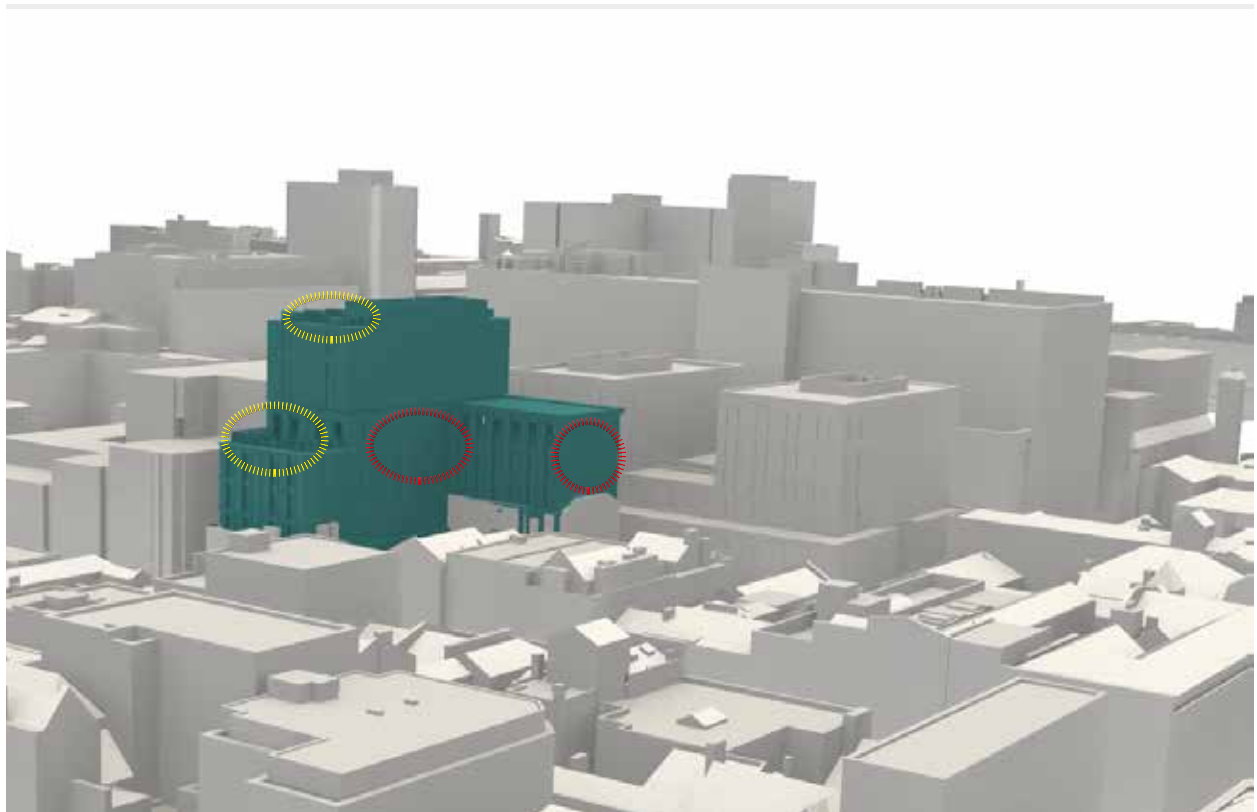


Fig. 10: The Proposed Development, as Viewed from the Second Dominant Wind Angle (West)



Fig. 11: The Proposed Development, as Viewed from the Spring Dominant Wind Angle (North East)

4 CONCLUSIONS

Potential wind effects were assessed for 68-70 Oldham Street, Manchester.

Consideration was given to the potential impact of the proposed development on local thoroughfares, proposed amenity spaces and building entrances.

Various potential risk factors for raised wind speeds were considered.

There is not considered to be a significant risk of raise wind speeds at ground level due to the proposed development.

As such, general thoroughfares and building entrances are expected to be suitable for the intended use.

There is a risk of some slightly raised wind speeds for the proposed roof terrace amenity, which may make it unsuitable for calmer activities such as long term sitting. This could be effectively mitigated either through raised balustrades or screening.

