

TOWN AND COUNTRY PLANNING ACT 1990 (AS AMENDED) SECTION 78

**TOWN AND COUNTRY PLANNING APPEALS (INQUIRIES PROCEDURE)
RULES 2000**

Appeal by: Fusion Manchester DevCo Ltd

Against refusal of planning permission for:

**Full planning permission for a 28-storey purpose built student accommodation
building (Sui Generis)**

**Land at Deansgate South
Manchester**

**Planning Inspectorate Ref: APP/B4215/W/21/3287525
Planning Application Ref: 129406/FO/2021**

**PROOF OF EVIDENCE BY ALEX TURPITT
DIRECTOR, ARCHITECTURAL AERODYNAMICS LTD.**

1.0 QUALIFICATIONS

1.1 My name is Alex Turpitt. I am a Wind Engineer and I hold the degree of MEng (Hons) Aerospace Engineering awarded by Brunel University. I am also a chartered engineer with the Institute of Mechanical Engineering.

1.2 I was previously employed by BMT Group Limited (formally BMT Fluid Mechanics Limited) from 2008 to 2018, where my specialities included instrumentation, data acquisition, wind microclimate analysis, building and wind monitoring, wind loading and wind engineering in general. I held the positions of wind tunnel technician, project engineer, project manager, Regional Manager (Europe) and Regional Manager (EMEA). In 2018 I founded an independent wind engineering consultancy, Architectural Aerodynamics Ltd, specialising in wind microclimate studies in the UK.

1.3 Over my career I have undertaken wind microclimate studies for hundreds of developments across the UK, with more than 50 being EIA developments. Architectural Aerodynamics is also a trusted peer review partner of several boroughs in the UK and London.

1.4 I am giving evidence for and on behalf of Manchester City Council in respect of Manchester City Council's refusal of planning application 129406/FO/2021. I was instructed on 9th February 2022 and have been provided with the relevant materials associated with the wind microclimate of the development to conduct a review:

- 129406_FO_2021-DESIGN___ACCESS_STATEMENT-1626225
- 129406_FO_2021-ES_VOL_1-1626223
- 129406_FO_2021-ES_VOL_2_APPENDIX_2.1_SCOPING_REPORT-1626210
- 129406_FO_2021-ES_VOL_2_APPENDIX_2.2_SCOPING_OPINION-1626209
- 129406_FO_2021-ES_VOL_2_APPENDIX_12.1_WIND_MICROCLIMATE_SAFETY_RESULTS-1872004

- 129406_FO_2021-ES_VOL_2_APPENDIX_12.2_WIND_MICROCLIMATE_COMFORT_RESULTS-1872007129406_FO_2021-GROUND_FLOOR_PLAN-1610559
- 129406_FO_2021-LANDSCAPE_MASTER_PLAN-1610591
- 129406_FO_2021-PROPOSED_SITE_LOCATION_PLAN-1610561

1.5 In addition to the above and during preparation of this evidence, Paul Evans (Wardell Armstrong) also provided additional supplementary material:

- summary exported.xlsx (Wardell Armstrong, 22 Feb 2022)
- Appendix 2 - Modelling Parameters and Wind Data.docx (Wardell Armstrong, 22 Feb 2022)
- 70deg safety baseline.png (Wardell Armstrong, 22 Feb 2022)
- 70deg safety.png (Wardell Armstrong, 22 Feb 2022)
- New Comfort Screenshots (Wardell Armstrong, 3rd March 2022)
- New Safety Screenshots (Wardell Armstrong, 3rd March 2022)
- 12 Wind Microclimate FINAL DRAFT updated (Wardell Armstrong, 3rd March 2022)

1.6 The evidence which I have prepared for and on behalf of Manchester City Council, in respect of the refusal of planning 129406/FO/2022 in this proof of evidence is true and has been prepared and is given in accordance with the guidance of my industry and I confirm that the opinions expressed are my true and professional opinions.

2.0 INTRODUCTION

2.1 This proof of evidence has been prepared on behalf of Manchester City Council (the Council). It relates to a planning appeal made pursuant to section 78 of the Town and Country Planning Act 1990, made by Fusion Manchester DevCo Ltd (the Appellant) in respect of land at Deansgate South, Manchester.

2.2 This appeal relates to the Council's decision to refuse full planning permission for a 28-storey purpose-built student accommodation building (sui generis).

2.3 Following determination by the Planning and Highways Committee at their meeting on 3 June 2021, planning application 129406/FO/2021 was refused on 4 June 2021 on the following grounds:

1. The proposal is not in close proximity to the University campuses or to a high frequency public transport route which passes this area and the applicant has failed to demonstrate robustly that there is unmet need for the proposed student accommodation; that they have entered into an agreement with an education provider for the provision of student accommodation; or that their proposal is deliverable. Furthermore, the proposal does not demonstrate a positive regeneration impact in its own right and would be contrary to the Great Jackson Street Development Framework and the efforts made to create a high quality residential area. It would, therefore, adversely impact upon the safety and welfare of future students, would not create a balanced high quality neighbourhood of choice and would be detrimental to the character of the area, undermining the on-going regeneration of the wider locality, including Castlefield and the Great Jackson Street area. It would thereby be contrary to policies SP1, H1, H12, CC3, CC8, CC10, T2 and DM1 of the Core Strategy for the City of Manchester and the National Planning Policy Framework.

2. The proposed building by reason of its scale, height, position on the site and its use of poor quality cladding materials, would form an over-dominant feature within the street scene and would fail to meet the quality that such a prominent building should achieve. It would thereby have a detrimental impact on visual amenity and is therefore considered to be contrary to policies SP1, EN1, EN2 and DM1 of the Manchester Core Strategy, guidance contained in the Guide to Development in Manchester Supplementary Planning Document and Guidance and the National Planning Policy Framework.
3. The proposed building by reason of its scale, height, position on the site and lack of public realm would form over-development of the site, having an overbearing relationship to the adjacent building and creating a feeling of overcrowdedness. It would thereby have a detrimental impact on urban design and visual amenity. It is therefore considered to be contrary to policies SP1, EN1, EN2, and DM1 of the Manchester Core Strategy, guidance contained in the Guide to Development in Manchester Supplementary Planning Document and Guidance and the National Planning Policy Framework.
4. The proposed building by reason of its scale, design and appearance would form an over-dominant and intrusive feature within the street scene and would thereby have a detrimental impact on the settings of the nearby listed buildings. The proposed building would cause less than substantial harm to the significance of these heritage assets, which would not be outweighed by the public benefits of the scheme. It is therefore considered to be contrary to guidance within the National Planning Policy Framework, policies SP1, CC9, EN3 and DM1 of the Manchester Core Strategy and saved policy DC19.1 of the Unitary Development Plan for the City of Manchester.

5. The proposed building by reason of its scale, design and appearance would form an over-dominant and intrusive feature within the street scene and would thereby have a detrimental impact on the character and appearance of Castlefield Conservation Area. The proposed building would fail to preserve or enhance the character and appearance of Castlefield Conservation Area and would cause less than substantial harm to the significance of this heritage asset, which would not be outweighed by the public benefits of the scheme. It is therefore considered to be contrary to guidance within the National Planning Policy Framework, policies SP1, CC9, EN3 and DM1 of the Manchester Core Strategy and saved policy DC18.1 of the Unitary Development Plan for the City of Manchester.
6. The proposed building by reason of its scale, massing and height would have a detrimental impact upon the wind environment around the building, requiring mitigation. The applicant has failed to demonstrate that the mitigation measures put forward are capable of implementation and no alternatives have been put forward. Therefore, it is considered that the proposed building, by reason of its scale, massing and height, could have a detrimental impact on the safety and comfort of pedestrians and cyclists, thereby being contrary to policies EN2 and DM1 of the Manchester Core Strategy.

Scope of Evidence

- 2.4 This proof of evidence deals with the issues connected with the sixth reason for refusal. My evidence should be read alongside the other proofs of evidence that have been prepared for and on behalf of the City Council by: Mr Mason on 'Design and Heritage Impact'; Mr Carty on 'Regeneration'; Mr Cole on 'Need'; and Mr Mitchell on 'Planning Policy'.

- 2.5** My evidence should also be read in conjunction with the Statement of Common Ground (SoCG) which identifies the issues where the City Council and the Appellant are in agreement. In addition, and at the time of preparation of this Proof, I am seeking to agree a statement of common ground in respect of wind issues with the Appellant's witness on those issues (Mr Paul Evans).
- 2.6** My evidence will support reason 6 of the refusal and will therefore focus on a review of chapter 12 of the Environmental Statement, dated January 2021 (CD-A59) and associated appendices "Appendix 12.1 Wind Microclimate Safety Results" and "Appendix 12.1 Wind Microclimate Safety Results" (CD-A83 and CD-A84 respectively). I will provide a review of the methodology employed and comment on its applicability in the assessment of wind microclimate in the UK, referencing best practice guidance and external documents where required.
- 2.7** Through the process of compiling this evidence I have liaised constructively with the Appellant's wind microclimate practitioner (Paul Evans of Wardell Armstrong) and it has been apparent that the original study had technical issues which caused the results to be unreliable. I have also obtained additional information from Mr Evans which will be referred to in my evidence. Because of this, I will not comment on the results of the original assessment but refer instead to updated results and the process / methodology which has been employed. As already noted, supplementary assessment material was provided by the Appellant during the preparation of this evidence and will be referred to where required. The recently received assessment material comprises new results documentation and a revised report. For the avoidance of doubt, the recent material that I have been provided with by the Appellant (through Mr Evans) is as follows:

- summary exported.xlsx (Wardell Armstrong, 22 Feb 2022)
- Appendix 2 - Modelling Parameters and Wind Data.docx (Wardell Armstrong, 22 Feb 2022)
- 70deg safety baseline.png (Wardell Armstrong, 22 Feb 2022)
- 70deg safety.png (Wardell Armstrong, 22 Feb 2022)
- New Comfort Screenshots (Wardell Armstrong, 3rd March 2022)
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3.0 APPEAL SITE AND SURROUNDS

3.1 The appeal site measures 0.06 ha, is irregular in shape and occupies a prominent location on a key gateway route into the City Centre. It has been vacant for some time and comprises hardstanding and scrub vegetation. It was last used as a garage and is now secured by a hoarding, with temporary use as a works area for the adjacent Deansgate Square development. There are two vehicular access points: one off Deansgate and one off Chester Road. The site slopes down from Chester Road along the southern edge to Deansgate. Due to the level difference, the boundary wall along Deansgate is in part a retaining wall.

3.2 The site is situated at the junction of Chester Road/Bridgewater Viaduct and Deansgate. To the north east is Deansgate Quay, a seven storey residential building with associated car parking. The site immediately to the west and north on the opposite side of Bridgewater Viaduct is occupied by two residential buildings, referred to as Castle Wharf. To the north east of the site are a variety of low-rise buildings that form the area of Knott Mill. To the south east is West Tower, which forms part of the Deansgate Square development, and to the south is a cleared site. Beyond this are the Bridgewater Canal Offices, which is a Grade II listed building on the south side of Chester Road. Buildings on the opposite side of Chester Road are generally at the towpath level of the Bridgewater Canal at the rear and are set back from Chester Road.

3.3 The site lies within the Great Jackson Street Development Framework area (SRF), the majority of which lies to the east and south of the site. The framework identifies that this area will be subject to significant regeneration and investment in low, medium and high rise residential development. A number of high density developments have been developed here or are under construction, all set amongst extensive public realm provided as part of those developments. These include Deansgate Square to the south east of the site and the Victoria Residence and Elizabeth Tower (Crown Street Phase 1) to the south west.

4.0 APPEAL SITE HISTORY

4.1 The planning history of the appeal site is addressed in the Statement of Common Ground and includes the following;

060909/FO/CITY3/00 - Mixed use development comprising (Class A3) at ground floor level with 30 residential units on upper floors, (10 storeys), approved 20.09.2001.

065560/FO/CITY3/02 - Mixed use development comprising food and drink use (class A3) at ground floor level with 45 residential units (class C3) on the upper floors and basement car parking, (11 storeys), approved 22.08.2002.

075170/FO/2005/C3 - Mixed use development comprising ground floor food and drink use (Class A3/A4), 54 residential units and internal parking, (14 storeys), approved 27.03.2007.

110730/FO/2015/C1 - Erection of a 13-storey building (plus basement level) comprising 53no. one and two bedroom apartments (Use Class C3), a commercial unit (Use Classes A1/ A2/ A3/ A4/ B1/D1), associated car parking, landscaping and vehicular and pedestrian access, approved 04.03.2016.

115591/FO/2017 - Erection of a 13-storey building comprising 53 residential apartments (Use Class C3a) together with ground floor commercial unit (135 sqm) (Use Classes A1 / A2 / A3 / A4 / B1a or D1), landscaping, loading bay and pedestrian access, approved 02.06.2017.

5.0 THE APPEAL PROPOSALS

5.1 The proposed development is a 28 storey purpose built student accommodation (PBSA) building, providing a total of 534 student bed spaces arranged across a mix of studios and cluster apartments. The proposal includes the following:

- 133 x studio apartments
- 30 x 1-bed apartments
- 40 x 2-bed apartments ('twodios') (80 beds)
- 27 x 3-bed apartments (81 beds)
- 21 4-bed apartments (84 beds)
- 21 x 6-bed apartments (126 beds)
- 639 sqm private amenity space, accessible to all residents
- 193 sqm external private amenity space across 3 terraces, accessible to all residents
- Reception area on the ground floor
- 92 secure cycle parking spaces on the lower ground floor;
- Bin store on the lower ground floor, to accommodate 20 no. 1100 litre Eurobins and 7 no. 240L bins, collected twice a week
- Rooftop solar photovoltaic panels
- Green roof.

5.2 All units would comply with Part M requirements, with 5% (27 bedrooms) designated as fully accessible. Servicing and refuse collections would take place from a lay-by on Deansgate.

- 5.3** The building would fill the site, except for a small corner on Deansgate that would accommodate a ramp for access to the bin and cycle stores. The building would have a 'flat iron' form and would step back at the 22nd, 24th and 26th floors from the most easterly corner of the site on the Deansgate elevation to form three roof terraces. The ground and mezzanine floors would have double height window bays along the two main elevations, with the main entrance to the building at the junction of Chester Road and Deansgate leading to a double height reception and amenity spaces. A vertical column of glazing would link the two main elevations at the main entrance point. Similarly, on the east elevation there would be a vertical column of glazing looking towards the City Centre.
- 5.4** Critically, from a wind microclimate perspective, the development presents a large bluff façade into prevailing winds which is likely to create significant downdraughts. These are likely to be channelled as they travel northwards through Deansgate. Additionally, the sharp western corner is likely to promote acceleration of lower-level winds. It is noted that developments to the south, including Great Jackson Street and Crown Street (Phase 1 and 2) have been included in the assessment and are likely to provide shelter. The inclusion of Great Jackson Street Plot E in the study is likely to create results which are less windy than in reality as the development has not yet started construction, reducing wind speeds by introducing shelter which is not currently there. The assessment should also be conducted without this development in place to represent the current scenario (without this additional shelter in place).

6.0 THE DEVELOPMENT PLAN

- 6.1** The Core Strategy Development Plan Document 2012-2027 ('the Core Strategy') was adopted by the City Council on 11th July 2012. It is the key document in Manchester's Local Development Framework. The Core Strategy replaces significant elements of the Unitary Development Plan (UDP) as the document that sets out the long-term strategic planning policies for Manchester's future development.
- 6.2** Core Strategy Policy EN2 (Tall Buildings) recognises the significant impact that tall buildings can have on the local environment and its micro-climate. *"It is therefore expected that this impact be modelled and that submissions for tall buildings also include appropriate measures to create an attractive, pedestrian friendly local environment."* Furthermore, *"It will be necessary for the applicant/developer to demonstrate that proposals for tall buildings are viable and deliverable."*
- 6.3** In addition, Policy EN2 also states *"Tall buildings by their very nature can dominate the street scene and be highly visible over long distances. They can also have an impact on the local micro-climatic conditions, for example, by creating wind tunnels. It is for these reasons that it is considered particularly important that they are designed to the highest quality, both in terms of appearance and their impact on the functioning of surrounding space"*

7.0 THE CASE FOR THE COUNCIL

- 7.1** It is my view that the wind microclimate assessment has not been completed in accordance with industry best practice and does not allow for comparison of expected wind conditions against the long-standing wind comfort and safety criteria for wind.

Chapter 12 of the ES – Wind Microclimate Methodology

- 7.2** Chapter 12 of the Environmental Statement is not considered to be comprehensive in providing the necessary details to determine the validity of the study. It is accepted that some of the technical processes described are robust and many elements of the study have been conducted reliably. I address the inadequacies as follows.
- 7.3** The industry standard for judging suitability in terms of wind conditions in specific locations is the Lawson Criteria. The Lawson Criteria takes the form of a table which sets threshold windspeeds for given activities. For a location to be deemed suitable for a given activity, windspeeds at that location must remain beneath the relevant threshold for at least 95% of the year. For a location to be deemed safe, windspeeds must remain beneath the safety threshold speed for at least 99.978% of the year. Table 12.1 of the ES correctly summarises a version of the Lawson Criteria which would be considered suitable for use.

- 7.4** Of particular importance is the statement within the assessment that, with respect to wind comfort “*wind speeds which should not be exceeded 95% of the time for given pedestrian activities to be carried out comfortably*”, as stated in paragraph 12.3.20 of the ES. Similarly, the wind safety criteria states that “*a safety threshold is set for the wind speed exceeded twice per year or 0.022% of the time from any wind direction*”, copied in paragraph 12.3.21 of the ES. Not referred to in the ES chapter is that the total period should be summed across all wind angles, and not treated independently for individual angles. Wind speeds in a given location are entirely dependent on the direction from which the wind is blowing. Therefore, any assessment must consider wind from a range of individual wind angles, and then use a statistical formulation to sum these together to find total exceedances.
- 7.5** The subject assessment does not calculate the total period of time wind speeds exceed comfort or safety thresholds. Instead, individual wind angles are assessed independently, and conclusions are based on these, without combining to find total exceedances. This methodology therefore presents results which would always be quieter than those which correctly sum exceedances over every wind angle. As a brief example, a given location could exceed 15 m/s for only 0.01% of the time for each wind angle. On their own, no wind angle at that location represents an exceedance of the safety criteria (which would be an exceedance of 15 m/s for 0.022% of the time). Summing each angle though (e.g. assuming exceedance for 0.01% of the time from 36 wind angles) would inform you that 15 m/s would be exceeded for 0.36% of the time at that location and would be considered an exceedance of the safety criteria.

- 7.6** Because the chapter does not sum exceedances across every wind angle, it is not possible to state what each location is comfortable for, or that it passes the relevant safety criteria. At the very least, wind conditions are therefore windier than those reported in the Appellant's assessment and could, at worst, represent a safety concern for users in and around the site.
- 7.7** Table 12.3 "Significance Criteria" states that wind conditions which are 1 category windier than desired would not need to be mitigated and would therefore be considered slight and not significant. In my experience even one category could be experienced as too windy for users of the site and any development should aim to mitigate all exceedances of the wind comfort criteria, therefore these exceedances would usually be considered significant.

- 7.8** Wind conditions as experienced by pedestrians can be broken down into 2 components – the *mean* and the *gust*. The mean is the wind speed averaged over a given length of time (usually 10 minutes), whilst the gust represents fluctuations which can serve to subject pedestrians to significant increases in wind speeds over a short period time. The Lawson criteria (and variants of it such as the City of London Guidelines) prescribe that an assessment takes into consideration both the mean and gust equivalent mean (GEM) wind speeds, with the highest of those values being used for the analysis. In paragraph 12.3.24 of the ES it states that “*The CFD simulation is steady state and does not explicitly quantify short-term gusts*”. This implies that the effect of gusts and turbulence has not been addressed. Without accounting for the gust equivalent mean wind speeds, the study is not considered to be complete and therefore summarises wind conditions which would be less windy when compared with those on site. These gust wind speeds often drive exceedances of the safety and comfort criteria for developments of this nature.
- 7.9** Because the chapter does not include calculations using the GEM wind speed, it is not possible to state what each location is comfortable for, or that it passes the safety criteria. Wind conditions are therefore windier than those reported by the Appellant and could, at worst, represent a safety concern for users in and around the site.

7.10 Paragraph 12.3.24 of the ES also states that, *“The consented buildings in the area have been included in the 3D model, however, if their designs were to change this could impact upon the wind speeds at the application site”*. It is best practice to assess the proposed development both within the context of existing surrounds and consented future developments. It should be the windier of these configurations which drives the requirement for wind mitigation in any area. Without assessing the development in the context of existing surrounds it is possible that worst-case wind conditions are not being reported. In this case, I am aware of the future developments to the south (particularly Crown Street and Great Jackson Street developments by Renaker Build) providing shelter for developments in the immediate vicinity of the proposed site. Unless their construction has substantially progressed, it would be prudent to test the development without these developments in place to ensure the worst-case has been assessed.

- 7.11** Additionally, it would be considered best practice to also assess the existing conditions at site. While this was not completed for the planning application, evidence has since been provided by the Appellant which suggests that this has been done for some wind angles. Of this additional information, “70deg safety baseline.png” and “70deg safety.png” suggests that there is an increase in wind speed relevant to the safety criteria, although this cannot be quantified with the information provided. Without a full assessment, it is not possible to conclude if the safety criteria is being exceeded due the introduction of the development or whether it is expected to exist in the existing scenario. It is possible to state that the proposed development is exacerbating the impact, but not to what extent. It is therefore not possible to state that the exceedance of the safety criteria is not an impact of the proposed development, which could create safety concerns for users of the Site.
- 7.12** Paragraph 12.3.24 of the ES also states that “*Analysis is based on virtual met mast wind data, provided by the Met Office and covers a 30-year period*”. Existing best practice in the UK requires data from suitable anemometers to be assessed to provide a suitable ‘open country’ wind frequency model. This model can then be transposed to (applied appropriately at) site. I cannot confirm if virtual met mast data is a suitable alternative to this process. I have therefore reviewed the supplementary information supplied separately to the planning application “Appendix 2 - Modelling Parameters and Wind Data.docx, Wardel Armstrong”. The wind frequency parameters presented here have been compared to data I have obtained for the site and through a brief visual comparison the use of this data is considered plausible.

- 7.13** It would however be recommended to repeat the assessment using best practice wind climate methodologies. A visual check is not comprehensive, and it is possible that conditions on site are not being accurately represented in the current assessment.
- 7.14** Of note however, is that only one set of frequency data is supplied. It is assumed that this describes the annual wind frequency distributions of wind speed and direction at the site. It would be best practice to analyse wind conditions for all seasons (with normally summer conditions representing the calmest conditions in the UK and winter representing the windiest season, but not always). This is to ensure that the worst / windiest season is analysed, and mitigation is provided to ensure suitable conditions at these times. If the assessment has been based on annual wind data, it is likely to be under-reporting wind conditions at the site.
- 7.15** Without assessing winter conditions, it is not possible to state what each location is comfortable for and conditions could, at worst, represent a nuisance for users in and around the site.
- 7.16** Paragraph 12.6.1 of the ES states that “*Wind Microclimate Guidelines for Developments in the City of London....has been used as guidance for this assessment*”. It should be noted that these guidelines recognise potential deficiencies of using a single methodology for a development of this nature and would require the use of both CFD and wind tunnel testing, this is particularly true when conditions are expected to be significantly windy or gusty.

- 7.17** At 28 storeys, the development could accurately be described as more than twice the height of many of the surrounding developments, particularly with respect to those in the upwind direction when considering prevailing wind directions. It is noted however that there are several equally tall, and taller developments within the immediate area. The methodology (or combination of methodologies) selected for assessment often depends on the specific characteristics of a given site and experience of the wind microclimate practitioner, but the guidelines do illustrate how wind tunnel studies can be used to support CFD studies, especially when there is a known quantity that is not being assessed as part of the CFD study (such as gust, as is the case here).
- 7.18** The criteria on which the guidelines are based (Lawson, 1990) specifically states that a gust speed should be calculated for these studies and that gusts cause the majority of cases of annoyance and distress and should be assessed in addition to hourly average wind speeds. For this reason and for the proposals in question, these guidelines would suggest that wind tunnel testing would be needed in conjunction with the CFD studies. From experience, I would recommend the same.

- 7.19** By conducting the study only via CFD and with the deficiencies noted, it is not possible to state what each location is comfortable for, or that it passes the safety criteria. Wind conditions are likely to be windier than those reported by the Appellant's assessments and could, at worst, represent a safety concern for users in and around the site.
- 7.20** Despite the flaws in the methodology, both the original and revised studies still concludes that there are exceedances of the safety criteria. It is likely that these exceedances are significantly more extreme than the revised (March 2022) chapter suggests. Without assessing the true value of exceedance of the safety or comfort criteria, it is not possible to recommend suitable mitigation. It is therefore likely that the suggestion of trees being used to mitigate these winds is also unreliable. It is also not possible to determine if these exceedances are present in the existing scenario or introduced with the proposed development. Without a full assessment and verification of the effectiveness of wind mitigation, it is not possible to state what each location is comfortable for, or that it passes the safety criteria. Wind conditions are therefore windier than those reported and could, at worst, represent a safety concern for users in and around the site.

8.0 CONCLUSION

8.1 I have summarised some key parameters of the methodology employed for the current study which do not confirm to industry best practice. The revised study received in March 2022 does not address the issues raised in this evidence which are still relevant to the assessment. Each of these individually has the potential to represent wind conditions inaccurately, such that they appear less windy than they are. In summary, these key areas of concern are:

- The total percentage of time the wind speed at any given location exceeds the comfort or safety threshold has not been calculated. Wind conditions are therefore likely to be significantly windier than those reported which could, at worst, represent a safety concern for users of the site.
- The CFD methodology employed does not include the gust component of wind. Wind conditions are therefore likely to be significantly windier than those reported which could, at worst, represent a safety concern for users of the site.
- The study has not considered the development in the context of existing surrounds (i.e. in the absence of consented schemes). Wind conditions in that scenario are therefore likely to be materially different than those reported which could cause a nuisance to users of the site.
- The study has not considered wind conditions across every season. Wind conditions are therefore likely to be windier than those reported which could cause a nuisance to users of the site.

8.2 The study is therefore not considered robust and does not accurately provide an assessment of wind conditions following completion of the proposed development. In reality, the wind conditions would be notably worse than those presented. Without an updated assessment, it is not possible to state that there is not a major adverse effect impacting safety of users in and around the site. Likewise, it is not possible to conclude that the Appellant's proposed wind mitigation will be effective (assuming that it can be implemented).

Appendices

1. Wind Microclimate Guidelines for Development in the City of London, City of London and RWDI, August 2019
 2. summary exported.xlsx (Wardell Armstrong, 22 Feb 2022)
 3. Appendix 2 - Modelling Parameters and Wind Data.docx (Wardell Armstrong, 22 Feb 2022)
 4. 70deg safety baseline.png (Wardell Armstrong, 22 Feb 2022)
 5. 70deg safety.png (Wardell Armstrong, 22 Feb 2022)
 6. New Comfort Screenshots (Wardell Armstrong, 3rd March 2022)
 7. New Safety Screenshots (Wardell Armstrong, 3rd March 2022)
 8. 12 Wind Microclimate FINAL DRAFT updated (Wardell Armstrong, 3rd March 2022)
 9. Lawson, T.V. The determination of the wind environment of a building complex before construction. Bristol : University of Bristol, Department of Aeronautical Engineering, 1990 (Extract).
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