Debenhams Site Redevelopment, Staines, United Kingdom

Wind Microclimate - Addendum

For

Future High Street Living (Staines) Limited

11 February 2022

Prepared By

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Executive Summary

A Computational Fluid Dynamics (CFD) based desk top analysis wind microclimate study has been carried out by FD Global Limited (FDG) to provide an assessment of the pedestrian level wind environment for the proposed redevelopment of the Debenhams site in central Staines, Greater London, UK. Specifically the study has considered the wind regime for proposed site conditions in the context of the proposed masonic Hall development and incorporates the generic wind climate at the site based on long-term wind statistics that have been manipulated using industry standard models of the Atmospheric Boundary Layer (ABL).

The main conclusions and recommendations of the wind assessment are summarised as follows:

- The assessment has shown that the likely impact of the proposed development in the public realm at ground level with the proposed Masonic Hall in place is such that the wind microclimate will remains as being suitable for the planned pedestrian uses throughout the site for existing site context in the public realm at ground level

- The assessment has further shown that there are no impacts of the proposed development in the public realm at ground level with the proposed Masonic Hall development in place that require wind mitigation measures over and above what the application scheme already includes.

- Specifically the assessment has also shown that with the Masonic Hall development in place the wind mitigation measures of the application scheme that mitigate ground level public realm impacts at the corner of High Street and Goodman Place are not required, which are:

    - Porous fins on the north east corner of the North Tower
    - A lower level canopy on the north east corner of the North Tower along Goodman Place and High Street

- The assessment has also shown that with the proposed Masonic Hall development in place the wind mitigation measures that have been incorporated in the application scheme in the elevated amenity spaces continue to be required but will remain effective as proposed.

1. Overview

The present report summarises the key findings of a Computational Fluid Dynamics (CFD) simulation based desk study assessment of pedestrian wind comfort and safety carried out by FD Global Limited (FDG) for the proposed redevelopment of the Debenhams site in central Staines, United Kingdom in regards of cumulative wind impacts of the proposed development in conjunction with future developments, specifically including the consented Masonic Hall site redevelopment.

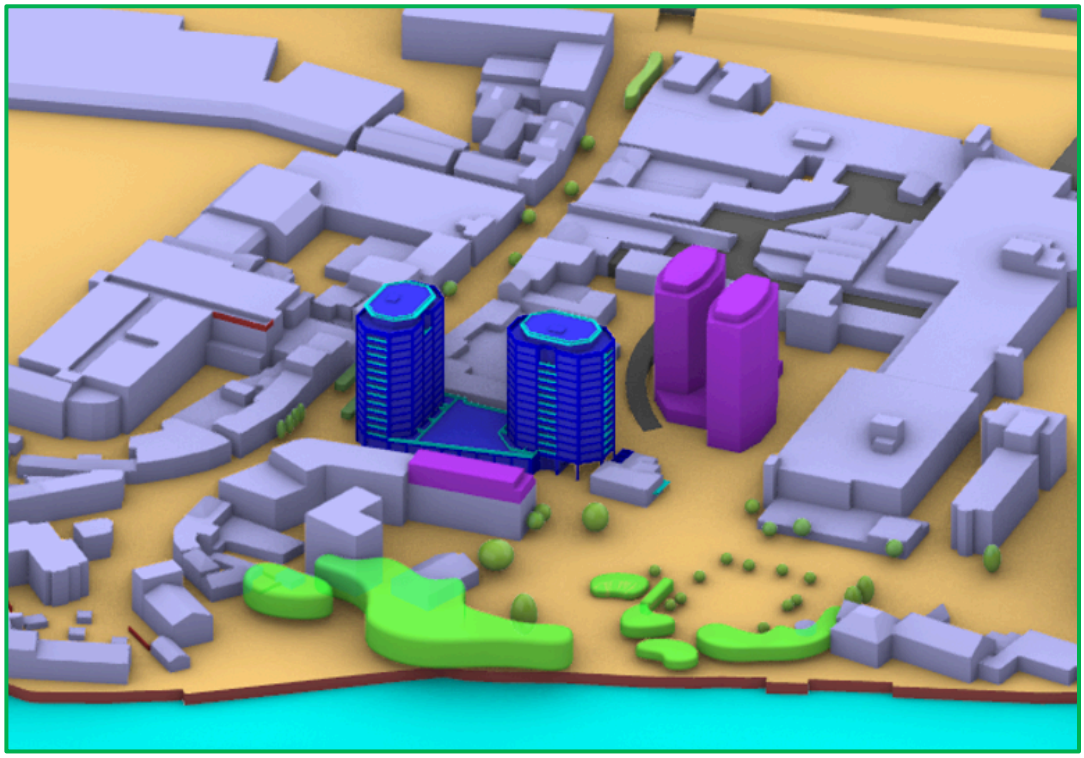
The details of the technical processes and the associated assessment methodology including assessment criteria and comfort / safety categorisation is reported on under separate cover in FDG's primary wind microclimate assessment report 'Debenhams Site Redevelopment, Staines, United Kingdom – Wind Microclimate' dated 2nd November 2021.

The studies reported in the present Addendum provide an assessment of potential wind impacts on the public realm, in key areas of sensitive pedestrian uses within the development at ground and elevated level and the surrounding areas for the proposed site conditions in the presence of future developments and specifically the consented Masonic Hall site redevelopment, based on accepted UK industry standard criteria.

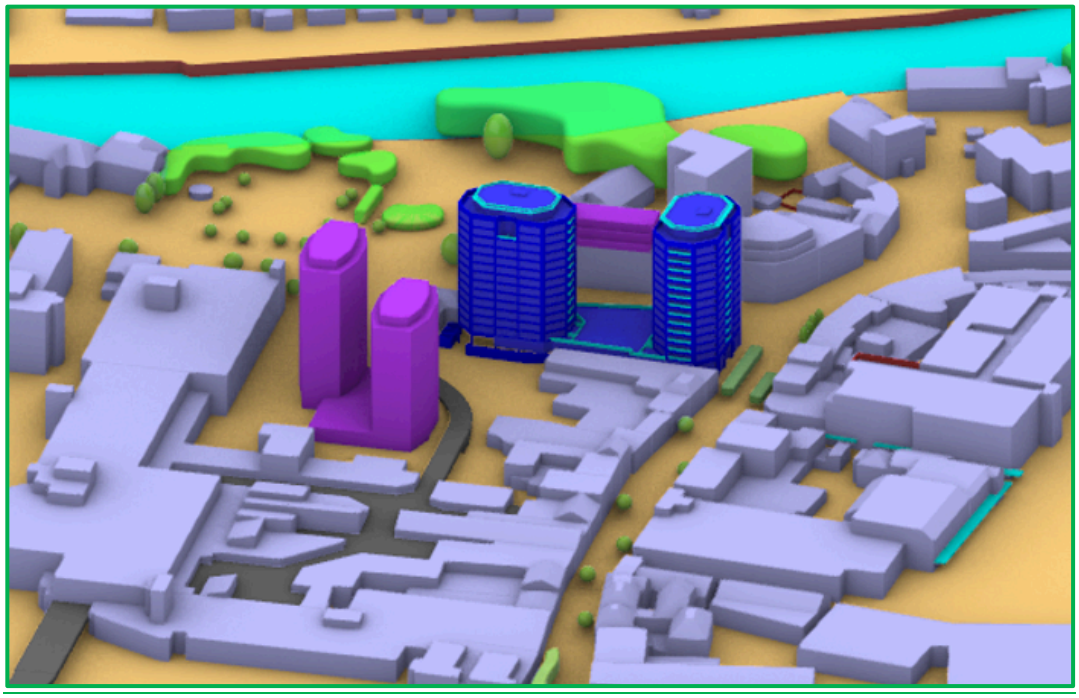
2. Wind Comfort / Safety Assessment

2.1. Modelling Scenarios

The modelling scenarios for the proposed site conditions and for the site conditions in future surrounds comprising the proposed Masonic Hall redevelopment are shown in 3D isometric view below.



Proposed Site Conditions With Consented Masonic Hall Site Redevelopment Viewed From South West

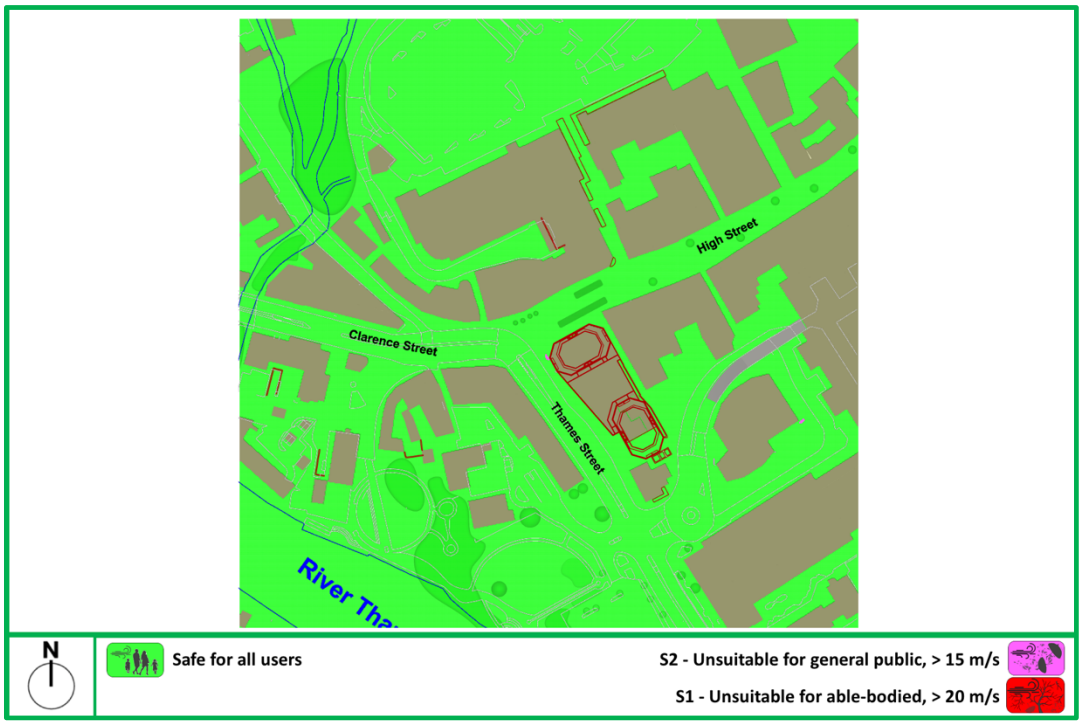


Proposed Site Conditions With Consented Masonic Hall Site Redevelopment Viewed From North East

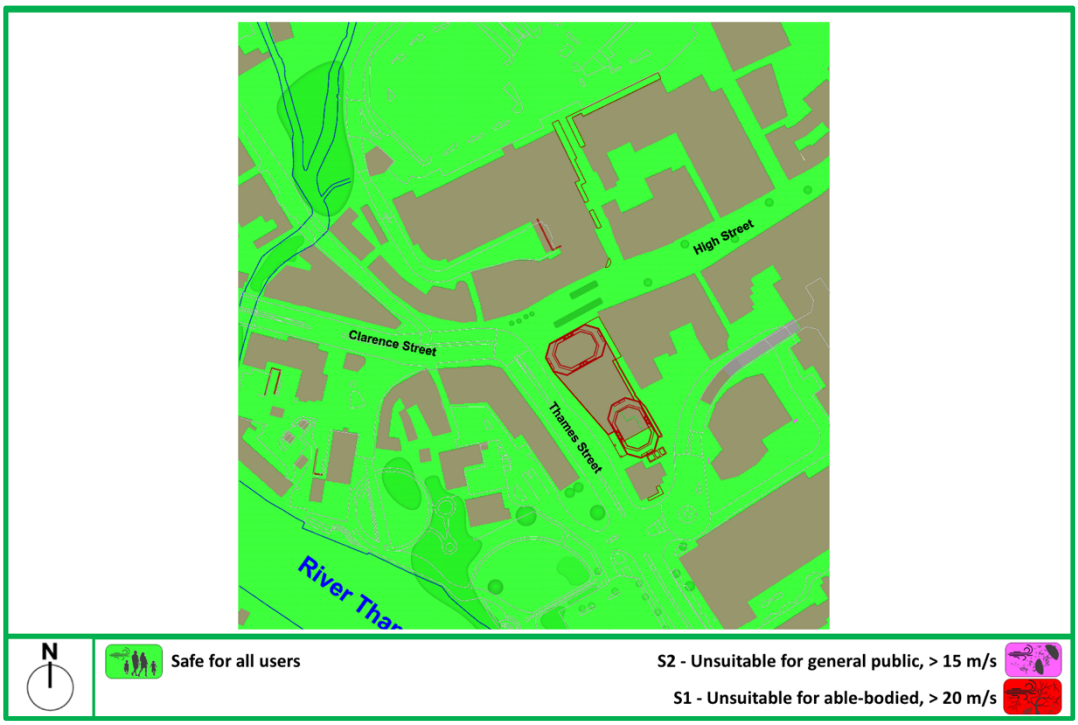
2.2. Wind Comfort and Safety Ratings – Public Realm at Ground Level

The following figures show the results of the wind comfort analysis in terms of comfort and safety ratings that have been calculated using the wind speed up factors obtained from the CFD simulations for each wind sector at ground level and by virtue of the numerical model simulations incorporate the key wind impact drivers as outlined above (i.e. downdrafts, so-called ground level corner and trapped vortex flows, canyon flows between extensively aligned rows of buildings and also shielding) and also the site specific wind climate statistics on each wind sector.

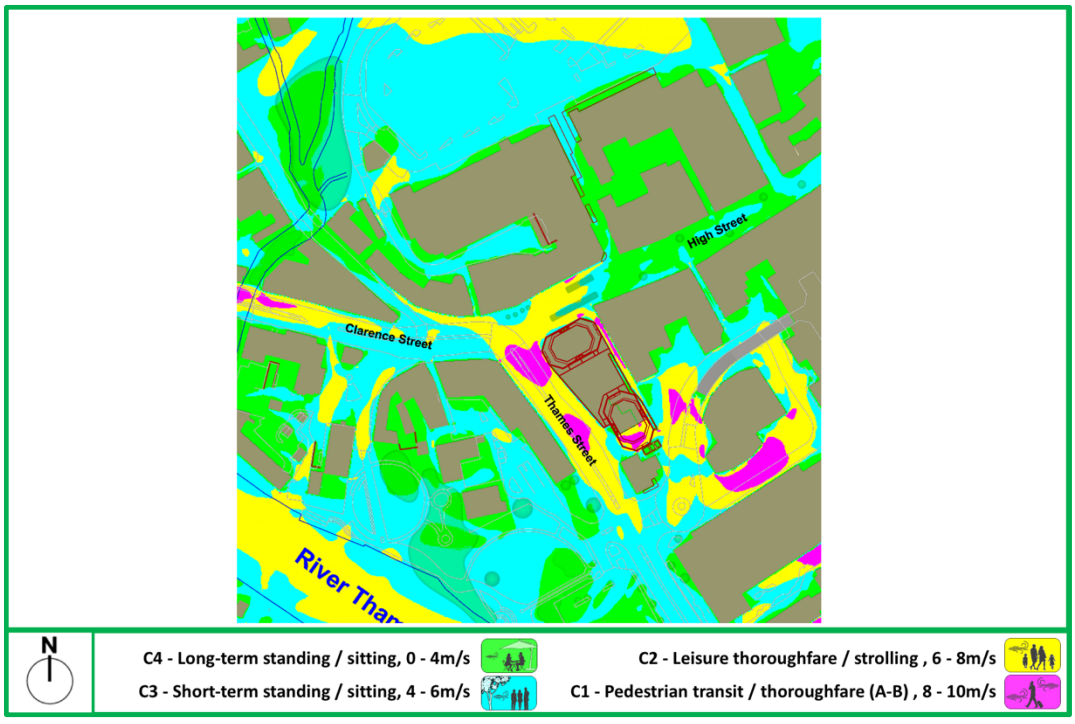
The results are presented in terms of comfort ratings for worst season and summer and safety ratings for the existing site conditions and for the proposed site conditions with existing surrounds and future surrounding buildings including the proposed Masonic Hall site redevelopment. Furthermore, the present assessment includes the results for wind impacts without wind mitigation measures that have been included in the application scheme design and also with the wind mitigation measure in order to ensure that the wind mitigation measures derived in the primary wind microclimate assessment in the existing surrounding context remain valid.



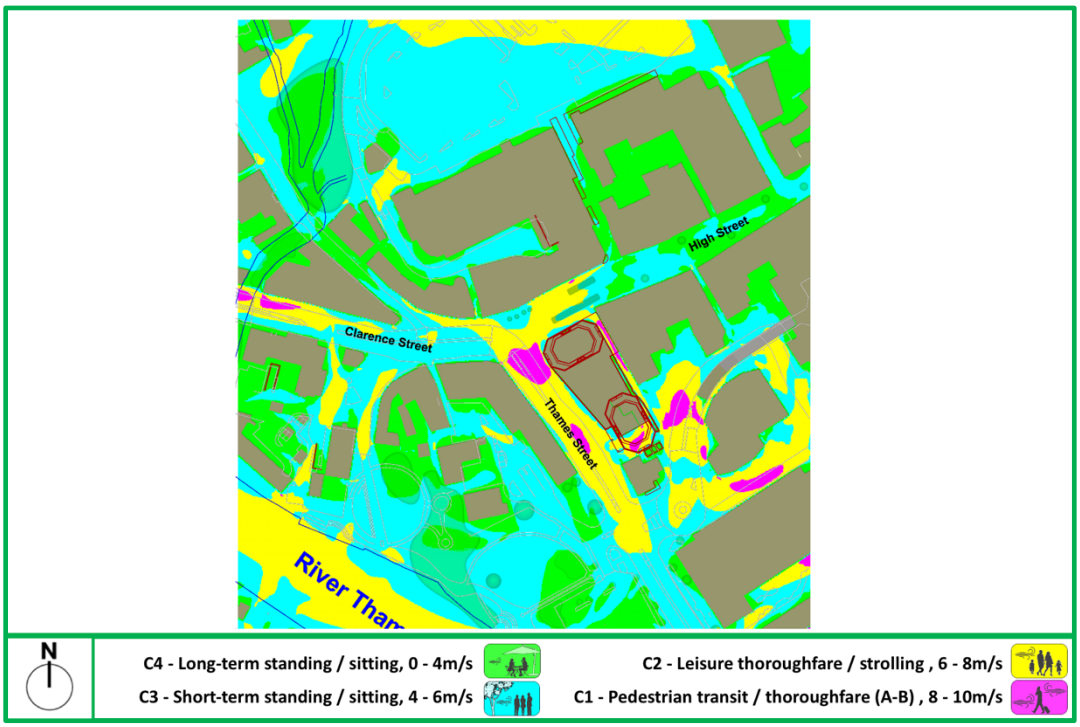
Proposed Site Conditions With Masonic Hall – Safety Without Wind Mitigation Measures



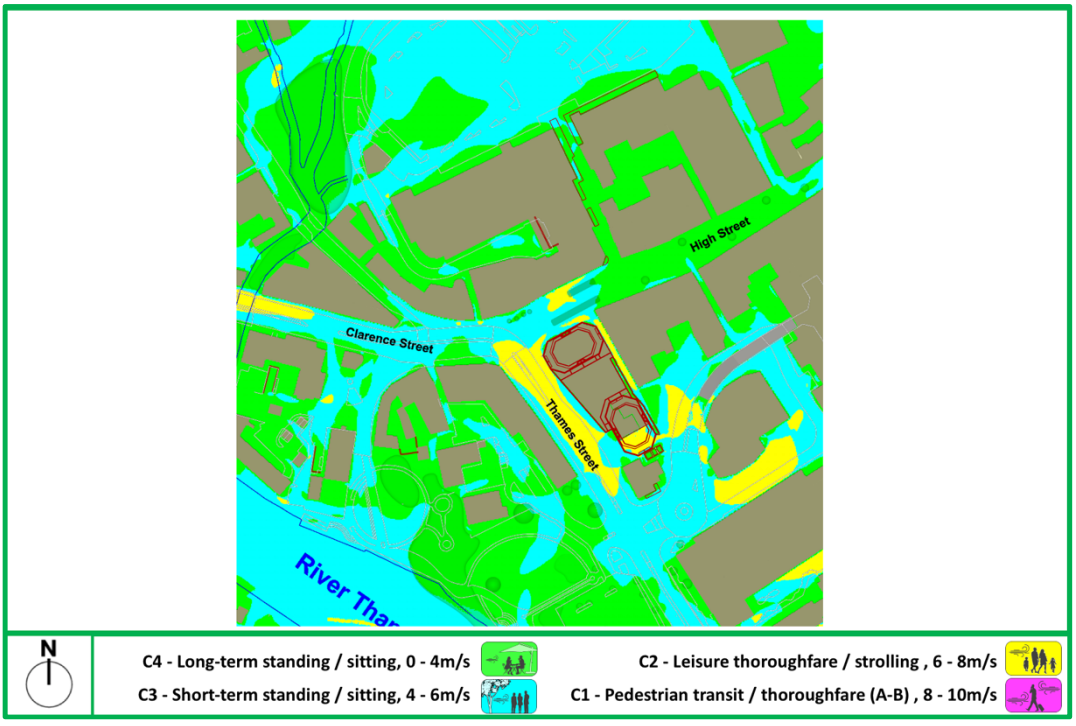
Proposed Site Conditions With Masonic Hall – Safety With Wind Mitigation Measures



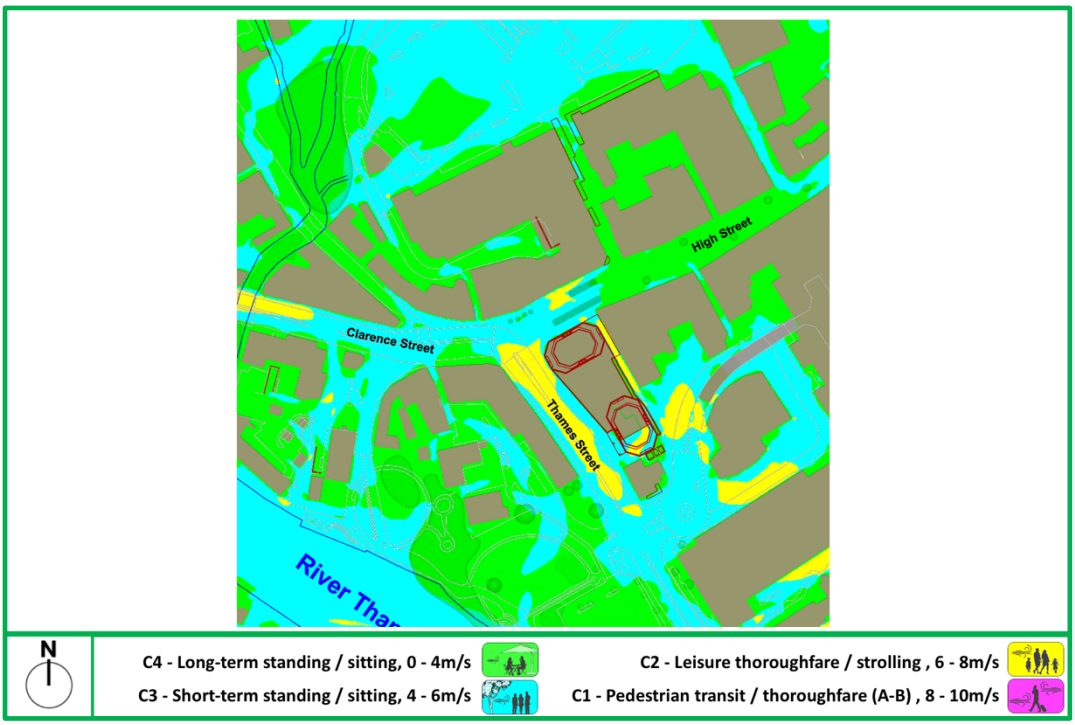
Proposed Site Conditions With Masonic Hall - Comfort Ratings Without Wind Mitigation Measures – Worst Season (Winter)



Proposed Site Conditions With Masonic Hall - Comfort Ratings With Wind Mitigation Measures – Worst Season (Winter)



Proposed Site Conditions With Masonic Hall - Comfort Ratings Without Wind Mitigation Measures – Summer Season



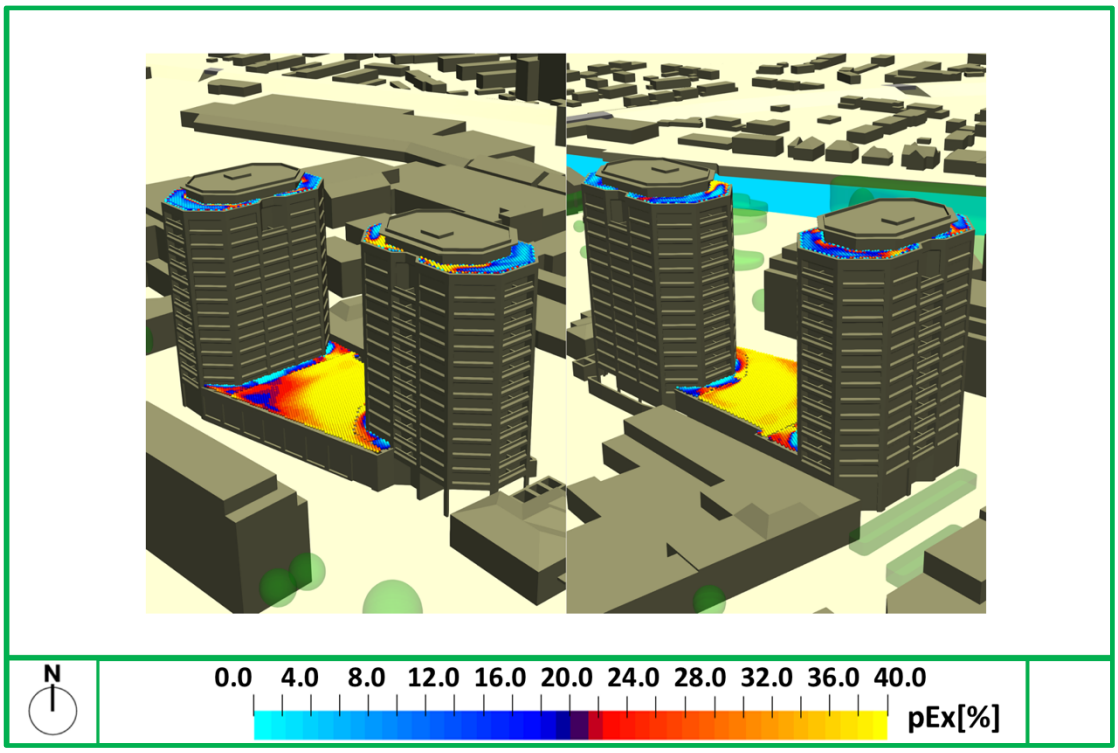
Proposed Site Conditions With Masonic Hall - Comfort Ratings With Wind Mitigation Measures – Summer Season

2.3. Wind Comfort and Safety Ratings – Public Realm at Elevated Level

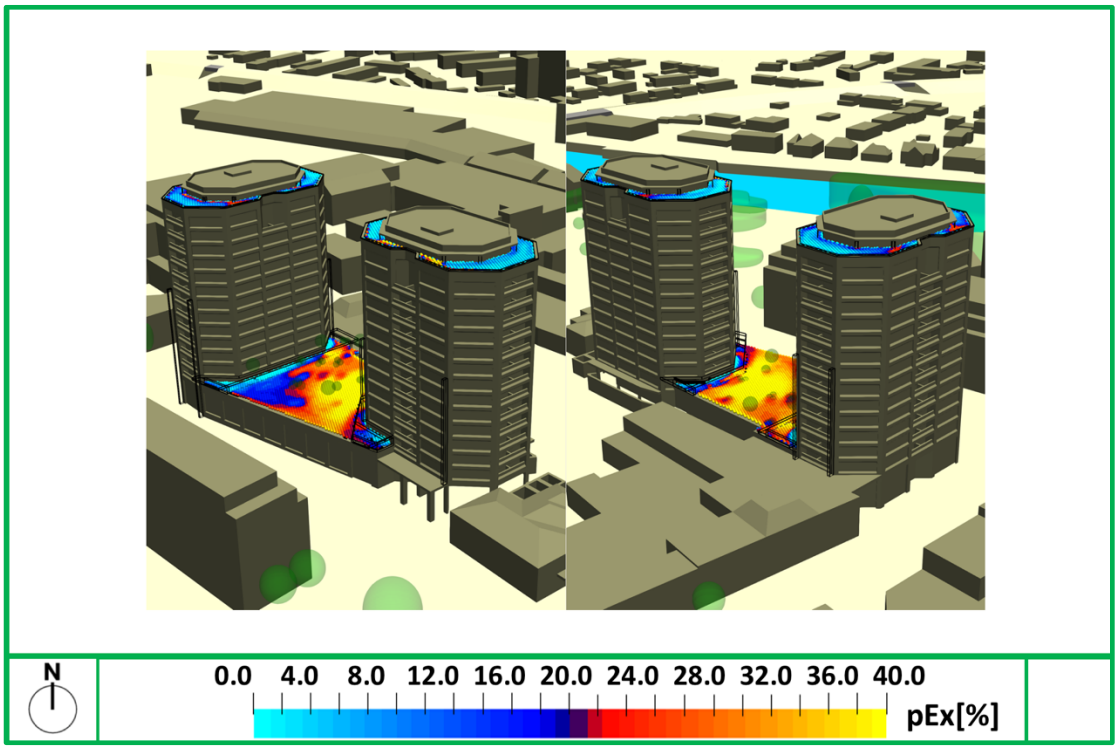
The following figures show the results of the wind comfort analysis in terms of comfort and safety ratings that have been calculated using the wind speed up factors obtained from the CFD simulations for each wind sector for the podium and Level 14 roof terraces spaces that are intended for outdoor recreational uses.

The target comfort level for these areas for recreational use is 'Long-Term Sitting Standing' (C4), which is associated with a 4 m/s threshold wind speed. The figures below, therefore, show the percentage of time that this threshold wind speed is exceeded i.e. the percentage of time that the spaces will be too windy for outdoor recreational activities. The results are shown averaged across all season of the year and also the summer season. In particular, the results are shown for the proposed development in the context of the proposed Masonic Hall site redevelopment with and without the application scheme wind mitigation measures.

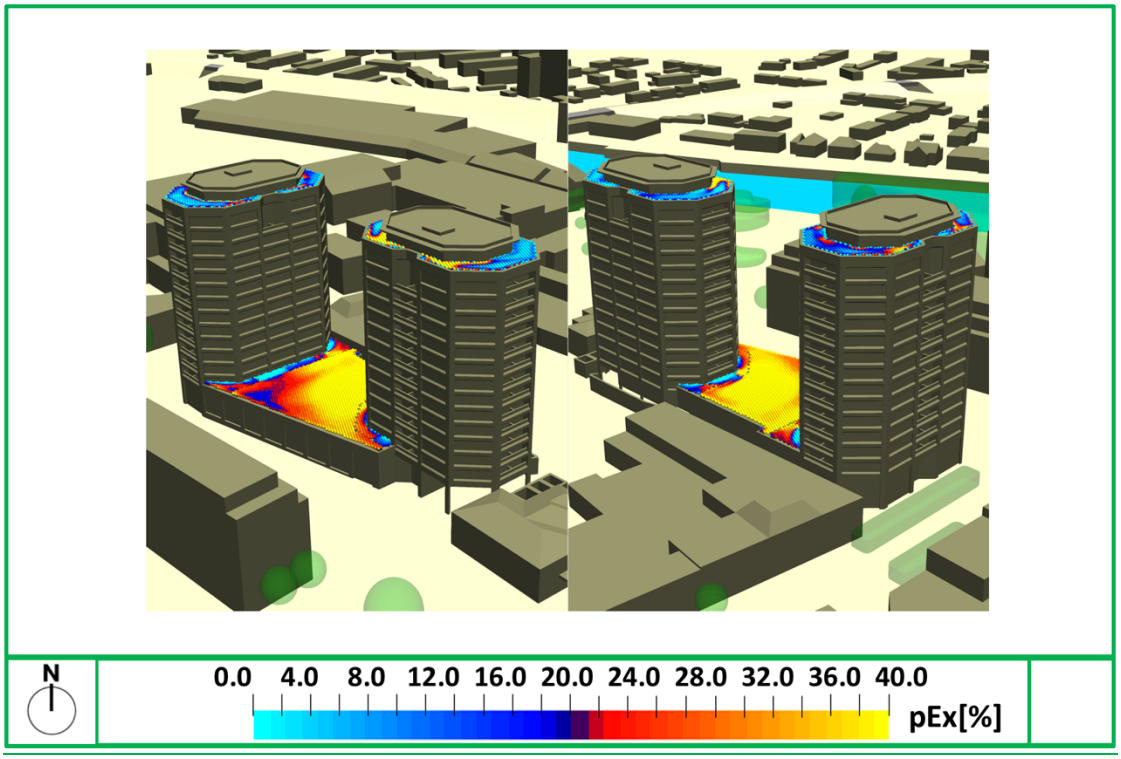
The target safety rating in these spaces is 'Safe for All Users' and the associated outcome of the safety assessment is also shown in the figures below.



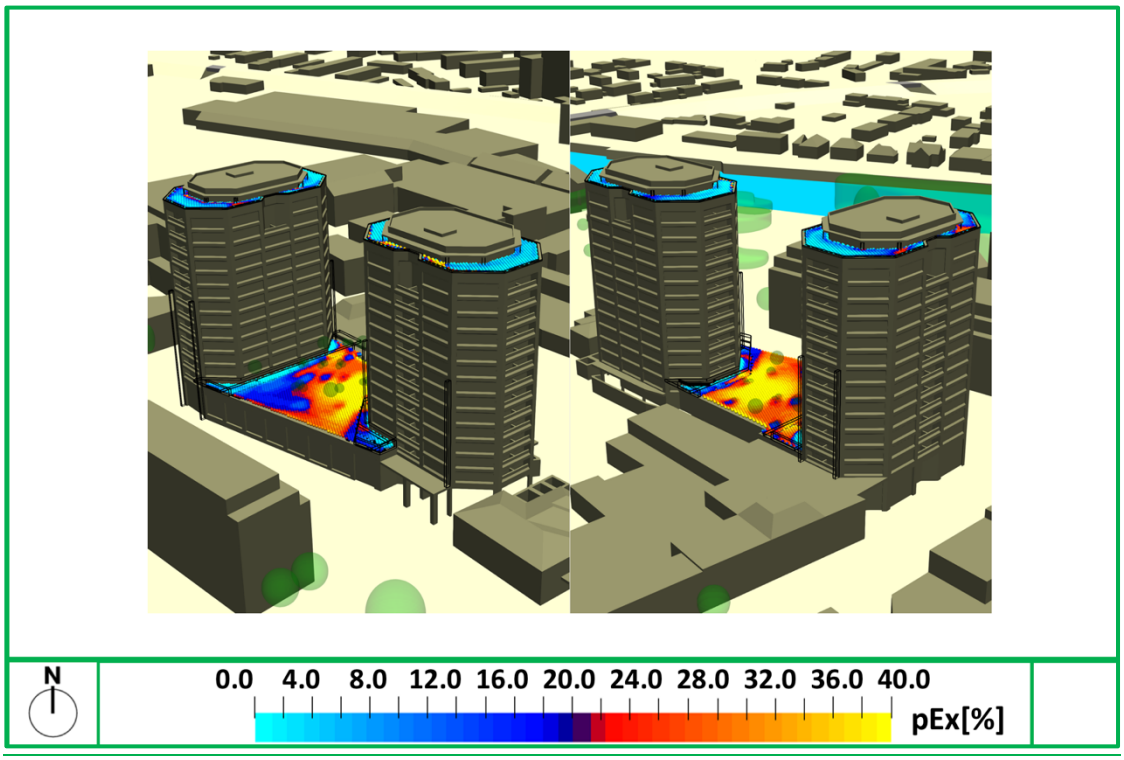
% of Time Unsuitable for Outdoor Sitting Across All Seasons – Podium And LVL 14 Terraces With Masonic Hall – Without Mitigation Measures



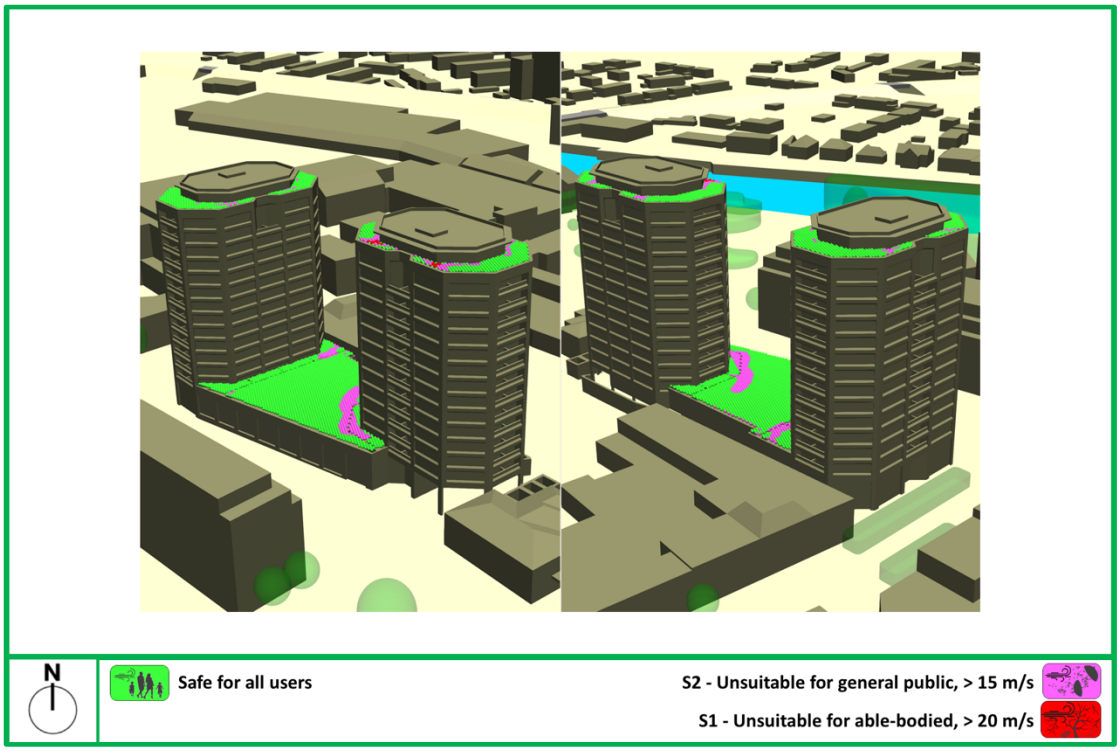
% of Time Unsuitable for Outdoor Sitting Across All Seasons – Podium And LVL 14 Terraces With Masonic Hall – With Mitigation Measures



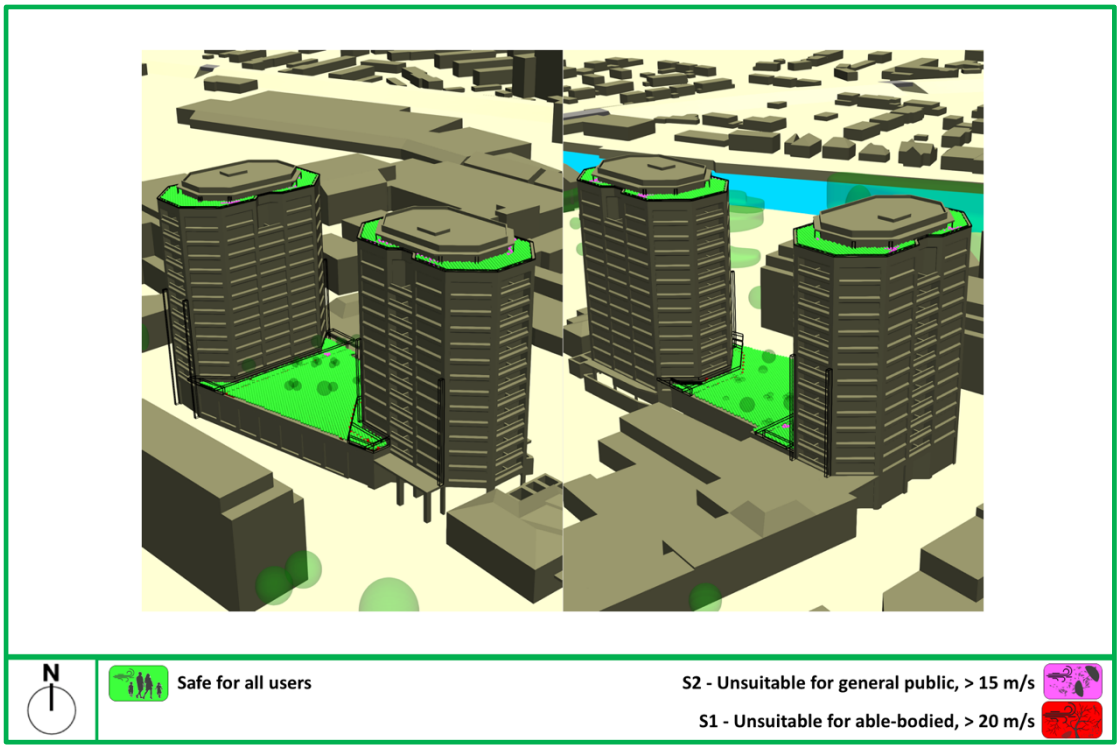
% of Time Unsuitable for Outdoor Sitting Summer Season – Podium And LVL 14 Terraces With Masonic Hall – Without Mitigation Measures



% of Time Unsuitable for Outdoor Sitting Summer Season – Podium And LVL 14 Terraces With Masonic Hall – With Mitigation Measures



Annual Safety Ratings With Masonic Hall – Without Mitigation Measures



Annual Safety Ratings With Masonic Hall – With Mitigation Measures

3. Suitability of Wind Comfort and Safety in the Proposed Site Conditions With Masonic Hall

3.1. Ground Level Public Realm

The suitability of wind comfort and safety and the impact significance in the proposed site conditions with the proposed Masonic Hall site redevelopment and the possible consequent need for local mitigation has been identified by comparing estimated worst-case wind comfort ratings against the minimum target comfort ratings using the UK industry standard criteria that form the basis of the present assessment.

For all areas the target safety rating is safe for all users. For areas of access and access and thoroughfare the minimum target comfort rating is 'Pedestrian Access / Thoroughfare' (C1). For primary building entrances that are not recessed or inherently shielded the minimum target comfort rating is 'Short Term Standing / Sitting' (C3), though this can be relaxed for secondary entrances such as emergency exits or plant room entrances.

The present assessment illustrates that wind impacts that the primary wind microclimate assessment has shown in proposed site conditions in existing surrounds with the proposed Masonic Hall development in Staines High Street and in Thames Street are materially improved. In all of these impact areas the comfort level in the worst season and in summer are predicted to meet the minimum required comfort classifications for the respective uses with the proposed Masonic Hall development in place. In terms of the Impact Significance Criteria that have been applied in the assessment, these impacts are classified as 'Moderate Adverse' with the Masonic hall development in place and therefore do not require mitigation measures over and above those that the application scheme already includes.

In particular it is noted that the very local breach of the pedestrian safety criterion on the corner of the High Street and Goodman Place noted for the proposed development in existing site context does not occur with the proposed Masonic Hall development in place and that therefore the associated wind mitigation measures that have been recommended for the application scheme on the north east corner of the north tower would not be required. Specifically these are:

- Porous fins on the north east corner of the North Tower
- A lower level canopy on the north east corner of the North Tower along Goodman Place and High Street

3.2. Higher Level Amenity Spaces at Podium Level and Roof Terrace Level 14

It can be seen that the wind regime within the amenity areas of the roof level 14 terraces as well as the podium level terraces with the Masonic Hall development in place is subject to local breaches of the minimum safety criteria meaning that the impact is classified as 'Major Adverse' in the absence of wind mitigation measures and, as a result, wind mitigation measures are thus required at both levels. This is consistent with the findings of FDG's primary wind microclimate assessment that considers the wind impacts in existing surrounds.

In terms of the minimum wind comfort level for the planned outdoor recreational activities that corresponds to 'Long Term Outdoor Sitting / Standing' (C4) it can be seen that, with the proposed Masonic Hall development, at podium level there is a significant stretch where wind conditions are

unsuitable for the planned recreational uses for up to 40% of the time across all seasons and also in summer. The roof terraces at level 14 for the most part comply with target comfort levels in excess of 75% - 80% of the time across all seasons as well as the summer season in the absence of wind mitigation measures. However, especially on the south facing stretch of the level 14 terrace, the suitability of the wind microclimate for outdoor sitting reduces to 60% of the time in winter season and also in summer.

With the wind mitigation measures in place that are included in the application scheme the extent of the podium level terraces with the proposed Masonic Hall in place for which the wind comfort is suitable for outdoor recreation in winter for more than 75% of the time has been substantially increased. For the summer period the wind comfort is suitable for outdoor recreation for the majority of the podium level space for 75% – 80% of the time with these wind mitigation measures in place. The wind comfort at the level 14 roof terraces with these wind mitigation measures in place is also substantially improved and it can be seen that the wind comfort in the winter season and in summer are in excess of 90% and 95% of the time respectively.

The present assessment has, therefore, shown that the wind mitigation measures that have been developed for the application scheme in existing context remain effective with the Masonic Hall development in place and thus require no adjustment to ensure suitable comfort and safety.

4. Conclusions and Recommendations

The main conclusions and recommendations of the wind assessment are summarised as follows:

- The assessment has shown that the likely impact of the proposed development in the public realm at ground level with the proposed Masonic Hall in place is such that the wind microclimate will remain as being suitable for the planned pedestrian uses throughout the site for existing site context in the public realm at ground level

- The assessment has further shown that there are no impacts of the proposed development in the public realm at ground level with the proposed Masonic Hall development in place that require wind mitigation measures over and above what the application scheme already includes.

- Specifically the assessment has also shown that with the Masonic Hall development in place the wind mitigation measures of the application scheme that mitigate ground level public realm impacts at the corner of High Street and Goodman Place are not required, which are:

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- The assessment has also shown that with the proposed Masonic Hall development in place the wind mitigation measures that have been incorporated in the application scheme in the elevated amenity spaces continue to be required but will remain effective as proposed.