

13. WIND MICROCLIMATE

Introduction

- 13.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of wind microclimate.

Policy Context

National Planning Policy Frameworkⁱ

- 13.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. It states that the purpose of the planning system is to contribute to the achievement of sustainable development; and that the planning system must meet interdependent overarching objectives summarised as: an economic objective, a social objective and an environmental objective.
- 13.3 There are no policies or statements that are directly related to the wind microclimate, although the promotion of high-quality built environments was emphasised in the NPPF. For instance, paragraph 127 states the following: "*[...] f) Create places that are safe, inclusive and accessible and which promote health and well-being, with high standard of amenity for existing and future users*"

Planning Practice Guidanceⁱⁱ

- 13.4 The PPG was published in November 2016 to support the NPPF and was updated in October 2019. There is no guidance within the PPG related to tall buildings and wind microclimate issues.

Regional Planning Policy

The London Plan – Spatial Development Strategy for Greater Londonⁱⁱⁱ

- 13.5 The London Plan places great importance on the creation and maintenance of high-quality environment for London. The following policies apply specifically in relation to wind microclimate:

- Policy 7.6 Architecture London
 - *"Architecture should make a positive contribution to a coherent public realm, streetscape and wider cityscape. It should incorporate the highest quality materials and design appropriate to its context."*
 - "Buildings and structures should [...] not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and microclimate. This is particularly important for tall buildings."
- Policy 7.7 Location and Design of Tall and Large Buildings
 - "Tall and large buildings should be part of a plan-led approach to changing or developing an area by the identification of appropriate, sensitive and inappropriate locations. Tall and large buildings should not have an unacceptably harmful impact on their surroundings."
 - "Applications for tall or large buildings should include an urban design analysis that demonstrates the proposal is part of a strategy that will meet the criteria below. This particularly important if the site is not identified as a location for tall or large buildings in the borough's LDF."
 - "Tall buildings [...] should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation and telecommunication interference."

Intend to Publish London Plan 2019^{iv}

13.6 This is a new London Plan (also known as a Replacement Plan). This London Plan replaces all previous versions. This document provides guidance for developments and is an integrated policy framework for local plans across London.

- Policy D3 Optimising site capacity through the design-led approach (Para 3.3.8), states that:
 - *"Buildings [...] massing, scale and layout [...] should complement the existing streetscape and surrounding area. Particular attention should be paid to the design of the parts of a building or public realm that people most frequently see or interact with in terms of its legibility, use, detailing, materials and location of entrances. Creating a comfortable pedestrian environment with regard to levels of [...] wind"*
- Policy D8 Public realm, Development Plans and development proposals, states that:
 - *"Consideration should also be given to the local microclimate created by buildings, and the impact of service entrances and facades on the public realm."*
 - *"Ensure that appropriate shade, shelter, seating [...] 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: Environmental impact, states that:
 - *"Wind [...] 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";*
 - *"Air movement affected by the building(s) should [...] not adversely affect street-level conditions".*
- Policy D9 Tall buildings: Cumulative impacts, states that:
 - *"The cumulative visual, functional and environmental impacts of proposed, consented and planned tall buildings in an area must be considered when assessing tall building proposals and when developing plans for an area. Mitigation measures should be identified and designed into the building as integral features from the outset to avoid retro-fitting."*

Sustainable Design and Construction Supplementary Planning Guidance (SPG)^v

13.7 The SPG states in section 2.3.7 that:

- *"Large buildings have the ability to alter their local environment and affect the microclimate. For example, [... tall buildings] can influence how wind travels across a site, potentially making it unpleasant at ground level [...] One way to assess the impact of large buildings on the comfort of the street environment is the Lawson Comfort Criteria. This tool sets out a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speeds and frequency of occurrence. It sets out a range of pedestrian activities from sitting through to crossing the road and for each activity defines a wind speed and frequency of occurrence. Where a proposed development is significantly taller than its surrounding environment, developers should carry out an assessment of its potential impact on the conditions at ground level, and ensure the resulting design of the development provides suitable conditions for the intended use."*

13.8 The SPG also advises using the Lawson Comfort Criteria to assess the impact of a large building on the comfort of the street environment, which sets out a scale for assessing the suitability of wind conditions in the urban environment.

Local Planning Policy

The Hounslow Local Plan

13.9 The Hounslow local plan^{vi} was adopted on 15th of September 2015 by Hounslow Borough Council. It will form part of the planning framework of the borough until 2030 and contains policy in regard to wind microclimate under the Context and Character section of the plan.

- *Policy CC3, Tall Buildings:*
 - *We will expect tall building development proposals to "(n) Provide for a comfortable and pleasant microclimate which minimises wind vortices [...]"*

Legislative Context

13.10 There is no legislation directly relating to wind microclimate issues relevant to the Development.

Assessment Methodology

Defining the Baseline

Current Baseline Conditions

13.11 The baseline conditions across the existing Site and the surroundings have been defined using wind tunnel testing to provide a detailed, quantitative assessment.

13.12 Mean and peak wind speeds have been measured for both the windiest season (normally winter) to show the worst case scenario, and summer season for amenity spaces (amenity spaces are assessed during the summer season as these areas are expected to be used most frequently during this period with an expectation of calmer conditions compared to other times of the year). This includes locations across the existing Site and at other surrounding buildings, paths, roads and areas of open spaces for 36 wind directions in 10° increments within a 360m radius of the Site which is considered a large enough scale to ensure all wind effects are captured. Details of the tunnel test methodology is presented in the section 'Wind Tunnel Test Methodology' of this chapter. Further detail on the wind tunnel testing methodology can be found in Appendix 13.1: Wind Technical Report, Annex 2.

13.13 The results have been combined with long-term meteorological climate data for the London

area (Heathrow and London City Airports). The meteorological data used in this assessment is deemed to be representative of the local wind microclimate for the London area. The meteorological data used is presented within the 'Baseline Condition – Meteorological Data' section below and shown in Figure 13.1.

- 13.14 The baseline conditions are reflected within 'Configuration 1: Existing Site with Existing Surrounding Buildings' (also referred to as the 'Baseline Scenario').

Future Baseline Conditions / Do Nothing Scenario

- 13.15 The evolution of the baseline condition (in the event that the Development does not come forward) has been considered using professional judgement informed by the results of the Baseline Scenario (Configuration 1) and the wind tunnel results undertaken as part of the cumulative effects assessment (see section 'Cumulative Effects' of this ES Chapter).

- 13.16 The cumulative scenario provides information on the general changes, if any, in wind conditions around the Site as a result of the Cumulative Developments. This cumulative effect assessment takes into account any other Cumulative Developments within the area surrounding the Site (presented within ES Chapter 2 EIA Methodology). The planning application for the proposed development of the Tesco Osterley site will be submitted concurrently with the planning application for the Development. However, as the Tesco Osterley site falls outwith the bounds of the wind tunnel model it was not assessed as part of the cumulative scenario. Due to the distance between the two sites, no likely significant cumulative effects would arise.

Wind Tunnel Testing Methodology

- 13.17 The methodology for quantifying the pedestrian level wind environment is outlined below within four steps. Further details of the assessment methodology is presented within Appendix 13.1.

- Step 1: The Site's induced wind speeds are measured for the appropriate configuration(s) at the appropriate pedestrian level(s) in the wind tunnel;
- Step 2: Standard meteorological data is adjusted to account for conditions at a subject site (for this assessment, meteorological data has been derived from the meteorological stations at two London airports (Heathrow and London City));
- Step 3: Data from Step 1 and Step 2 is combined to obtain the expected frequency and magnitude of wind speed for the appropriate configuration(s) and at the appropriate

- pedestrian level(s); and
- Step 4: The results of Step 3 are compared with the Lawson Comfort Criteria (and where relevant, the change in the wind microclimate conditions between appropriate test configuration(s)) to 'grade / score' the conditions within and around the Site.
- 13.18 To produce the results within the wind tunnel, a 1:300 scale model comprising the Site and the surrounding area (including relevant existing buildings and other topographical features) was constructed on a 2.4m diameter disc allowing for the surrounding area within a 360m radius of the centre of the Site to be modelled (the radius is determined based on the scale model and due to the physical constraints of the modelling in the wind tunnel). This radius is considered a large enough scale to ensure all likely wind effects are captured. The diameter of the board is restricted to the scale of the wind tunnel, in this case this is a 1.2m board and therefore at a scale of 1:300, this is equivalent to 360m at full scale. Any building that falls outside of thi radius is considered in the terrain analysis.
- 13.19 Wind is unsteady, or gusty, and this 'gustiness' or turbulence, varies depending upon the Site. In order to model the likely effects of gustiness or turbulence (which depends on the geographical location), a combination of spires and floor roughness elements have been employed in the wind tunnel in order to create a 'boundary layer' that is representative of the urban location of the Site. The detailed wind tunnel model around the Development is used to fine-tune the flow and create conditions similar to those expected at full scale.
- 13.20 Other existing developments outside the 360m radius of the Site would not individually be expected to modify the wind conditions approaching the Site, therefore the buildings that fall outside this radius have been included within the analysis of the surrounding terrain rather than modelled in the wind tunnel.
- 13.21 To test the impact of the Development, a scale model of the buildings comprising the completed Development has been constructed (Configuration 2: The Development with Existing Surrounding Buildings).
- 13.22 Wind speed measurements within and around the Site for the tested configurations were established using 'Irwin probes'. These sensors are able to measure the mean and gust wind speeds at a full-scale height of approximately 1.5m above the surface upon which the probe is located.
- 13.23 The wind speed was measured at up to 157 locations under the configurations for all wind directions in equal increments, with 0° representing wind blowing from the north and 90° wind from the east and so on.

Model Configurations Assessed

13.24 The assessment of the wind microclimate is based on the results from a series of tests of physical models (Figure 13.1) within the wind tunnel to provide a detailed, quantitative assessment. The existing landscaping on-site and off-site was included in order to provide an accurate representation of the environmental context and the wind microclimate across the Site for all tested configurations.

13.25 Configurations tested within the wind tunnel include:

- Configuration 1: The Existing Site with Existing Surrounding Buildings (the Baseline Scenario);
- Configuration 2: The Development with Existing Surrounding Buildings; and
- Configuration 3: The Development with Existing and Cumulative Surrounding Buildings;
- Mitigation: The Development with Landscaping, Wind Mitigation and the Existing Surrounding Buildings; and

13.26 Cumulative developments identified within the 360m radius of the Site assessed in the wind tunnel model are:

- Former Syon Gate Service Station, Land at South of Gillette Corner, Great West Road, Isleworth TW7 5NP (Ref: 00505/AF/P28);
- New Horizons Court, Ryan Drive, Brentford, TW8 9EP (Ref: 02912/A/P1);
- 891 Great West Road, Isleworth London TW7 5PD (Ref: 00505/891/P4); and
- 4 and 8 Harlequin Avenue, Brentford, TW8 9EW (Ref: 00558/4-8/P1).

13.27 Other known cumulative developments outlined in Chapter 2 but which would be outwith the bounds of the wind tunnel model are as follows:

- Sky, Sites 6 & 7, Grant Way, Isleworth TW7 5QD (Ref: 00558/A/P69);
- Bolder Academy, 1 MacFarlane Lane, Isleworth, TW7 5PN (Ref: 01106/W/P9);
- 1 Commerce Road, Brentford, London, TW8 8LE (Ref: 00297/H/P13); and
- Tesco Superstore, Syon Lane, Isleworth, TW7 5NZ (to be submitted concurrently with the planning application for the Homebase development).

13.28 In general, models situated outside the 360m radius of the model would have less influence on the wind conditions at the Site unless these models were of significant height, which none of the cumulative schemes are. These cumulative schemes are therefore taken into account

in the terrain analysis as described in paragraph 13.20.

13.29 The original wind tunnel model was constructed (for the first three configurations) based on the following drawing information:

- 579-PTA-ZZ-ZZ-M3-A-0001_MassingOption1k_P02 (Received November 08, 2019);
- List of cumulative schemes included in Chapter 2 EIA Methodology (those relevant to wind assessment, as set out above);
- 1553-004J Combined All Levels Landscape Masterplan (Received December 16, 2019); and
- 1553-018 Tree Size Plan and Schedule (Received December 18, 2019).

13.30 The mitigation configuration wind tunnel model was constructed based on the following drawing information:

- 579-PTA-ZZ-ZZ-M3-A-2001_P07 - Design Freeze for Revised Scheme (Received September 02, 2020); and
- Landscape Plans - 1553 GFL+PL Base_20200915 (Received September 15, 2020).

13.31 The plans used to construct the wind tunnel model for the original three configurations differ from the mitigation configuration as the design of the Development has evolved and some massing and balcony location amendments were made after the original wind tunnel assessment. The mitigation configuration thus takes into account the updated final design of the Development and proposed landscaping including wind mitigation measures. The probe locations were also modified to study the effect of wind at locations that were not previously monitored.

Assessment Criteria

Lawson Comfort Criteria

13.32 The assessment of the wind conditions requires a standard against which the wind measurements can be compared. This assessment of the wind tunnel results presented in this ES Chapter adopts the Lawson Comfort Criteria ('the Lawson Criteria') (LDDC version)^{vii}, which have been established for over 30 years.

13.33 The Lawson Criteria described in Table 13.1 is presented to define the reaction of an average pedestrian to the wind. If the measured wind conditions exceed the threshold wind speed for more than 5% of the time, then they are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area

for its intended purpose.

- 13.34 The Lawson Criteria set out four pedestrian activities (comfort categories) and reflect the fact that less active pursuits require more benign wind conditions. The four categories are: sitting, standing, strolling and walking, in ascending order of activity level, with a fifth category for conditions that are uncomfortable for all uses. In other words, the wind conditions in an area required for sitting need to be calmer than a location that people merely walk past.
- 13.35 The coloured key in Table 13.1 corresponds to the presentation of wind tunnel test results.

Table 13.1 Lawson Comfort Criteria

Key	Comfort Category	Threshold	Description
	Sitting	0-4 m/s	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods
	Standing	4-6 m/s	Gentle breeze acceptable for main building entrances, pick-up/drop-off points and bus stops
	Strolling	6-8 m/s	Moderate breezes that would be appropriate for strolling along a city/town centre street, plaza or park
	Walking	8-10 m/s	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
	Uncomfortable	> 10 m/s	Winds of this magnitude are considered a nuisance for most activities and wind mitigation is typically recommended

Target Wind Conditions

- 13.36 For a mixed-use urban environment, such as the Site and surrounding area, the desired wind microclimate for the Development would typically need to have areas suitable for sitting, standing/entrance use and strolling (Table 13.1).
- 13.37 The walking and uncomfortable classifications may be acceptable in isolated areas, but these classifications are also associated with occasional strong winds (which are described below) and so the aim has been to avoid conditions falling into these categories.

Amenity Areas

- 13.38 The target condition for seating in amenity areas is a wind microclimate that is suitable for sitting during the summer season. This is because these areas are more likely to be frequently used during the summer when pedestrians would expect to be able to sit comfortably. If an area is classified as suitable for sitting in the summer, the windier conditions that occur during

the winter season usually mean that the area would be classified as suitable for standing in the windiest season, unless additional shelter was provided.

- 13.39 Large upper level terraces and large amenity spaces are assessed on the basis that they are intended for good-weather use only. A mix of sitting and standing conditions during the summer would be acceptable provided that any desired seating areas are situated in areas having sitting use wind conditions.

Entrances

- 13.40 Areas in proximity of building entrances, a wind environment suitable for standing or calmer is desired, as pedestrians will transition from the calm indoors to the windier outdoors throughout the year. The assessment for building entrances therefore focuses on the windiest season result.
- 13.41 An entrance which is recessed or contains a draught lobby provides a transition area for pedestrians entering or exiting the building. If strolling conditions are observed on the pavement outside a recessed entrance, or entrance with a draught lobby, acceptable standing conditions would be expected at the recessed entrance.

Secondary Entrances

- 13.42 Considered as entry points to a building which are not primary entrances and used for alternative purposes, like fire entrances or emergency exits, a wind environment for strolling or calmer is desired. The assessment focuses on the windiest season.

Thoroughfares

- 13.43 A pedestrian thoroughfare should be suitable for strolling during the windiest season. The assessment for pedestrian thoroughfares therefore focuses on the windiest season result.
- 13.44 Localised occurrence of walking conditions may be acceptable in areas with limited footfall, or service areas, as long as the strong wind criteria (see section 'Strong Winds' below) is not exceeded.

Crossings

- 13.45 Crossings should be suitable for walking during the windiest season.

Carriageways

- 13.46 The Lawson Criteria (Table 13.1) does not specify criteria for acceptable wind conditions for cyclists; however, the occurrence of winds exceeding the strong winds threshold (as described below) would be considered unsuitable for cyclists. The assessment for carriageways focusses on the windiest season.

Bus Stops and Railway Station

- 13.47 A bus stop/railway station should be suitable for standing use during the windiest season. The assessment for bus stops/railway station therefore focuses on the windiest season result.

Strong Winds

- 13.48 The Lawson Criteria (Table 13.1) also specifies a strong wind threshold when winds exceed 15m/s for more than 0.025% of the time (approximately 2.2 hours of the year) would have the potential to cause distress to more vulnerable pedestrians and cyclists. Exceedance of this threshold may indicate a need for remedial measures or a careful assessment of the expected use of that location; e.g. is it reasonable to expect older adults or young children to be present at the location on the windiest day of the year?
- 13.49 Wind speeds that exceed 20m/s for more than 0.025% of the time (approximately 2.2 hours of the year) represent a safety issue for all members of the population, which would require mitigation to provide an appropriate wind microclimate environment.
- 13.50 Strong winds are generally associated with areas which would be classified as acceptable for walking or conditions considered uncomfortable. In a mixed-use urban development scheme, walking and uncomfortable conditions would not usually form part of the 'target' wind environment and would usually require mitigation due to pedestrian comfort considerations. This mitigation would also have the impact of reducing the frequency of, or even eliminate, any strong winds.

Limitations and Assumptions

- 13.51 This assessment is based on worst-case wind speeds, expected to be encountered during the winter season (December, January and February) in the UK. Additional consideration has been made for summer wind conditions due to the presence of ground floor public amenity space. This complies with the standard methodology set out by Lawson^{vii} for wind-microclimate

assessments.

13.52 It is expected that use of outdoor amenity spaces and rooftop terraces for sitting will be limited to the summer season. During the winter, it would be expected that these spaces would increase a criteria level to standing use.

13.53 It is assumed that there will be restricted access (i.e. not accessible to the general public) across the Site during the demolition and construction works, and therefore windier on-Site conditions will be tolerable as the area is not for typical pedestrian use where the tolerable wind speed threshold would be lower.

Defining Significance

Receptor Sensitivity

13.54 The sensitivity of a receptor in the presence of the Development is high and equal for all measurement locations. This is because the significance criteria for the wind assessment are based on whether the wind environment of the Site is acceptable for the intended use. As such, an equal sensitivity is assigned to each receptor within and surrounding the Development; as well as the existing buildings and their surroundings, where many of the same probe locations have been used. The geographical extent of the wind microclimate is expected to be within the Site and its immediate surroundings i.e. a local effect, for all receptors.

13.55 The following description of receptor categories for both on and off Site and the approach taken to the allocation of the probe locations to the categories is as follows:

- On-Site locations:
 - *Pedestrian Thoroughfares: includes areas that are immediately adjacent to the Development (i.e. within 5m of the building line). This also includes thoroughfares within the Development;*
 - *Entrances: includes entrances at ground level;*
 - *Amenity areas: ground floor, podium and roof terrace (includes terraces located on the upper levels of the buildings); and*
 - *Crossings, Bus stops and Roadways; and*
- Off-Site locations: includes all receptors falling outside the definition of the boundary of the Site, such as along roadways, surrounding building entrances and amenity areas.

Magnitude of Impact

- 13.56 All identified receptors are deemed to be of high impact and high magnitude as any locations with windier conditions than considered comfortable or unsafe conditions will require mitigation.

Effect Significance

- 13.57 The significance criteria used in the assessment of potential and residual effects at the measurement locations are based on the comparison of the predicated wind conditions at a particular measurement location with the desired pedestrian use of the Site as defined in the Lawson Comfort Criteria. Where appropriate, wind conditions experienced across the Site are also compared against the baseline conditions as referenced in paragraph 13.64.
- 13.58 An adverse effect implies that a location has a wind environment windier than suitable as defined by Lawson and mitigation should therefore be considered. A beneficial effect is reported where the local wind conditions are calmer than the target conditions for the intended use of the measurement location.
- 13.59 The minor, moderate and major categories indicate the severity of the difference between the desired wind microclimate and the expected wind conditions in the presence of the Development. These are detailed in the seven-point scale shown in **Error! Reference source not found..**

Table 13.2 Significance Criteria

Expected Wind Microclimate	Significance of Effect
Wind conditions are 3-steps calmer than those desired	Major Beneficial
Wind conditions are 2-steps calmer than those desired	Moderate Beneficial
Wind conditions are 1-step calmer than those desired	Minor Beneficial
Wind conditions are as desired	Negligible
Wind conditions are 1-step windier than those desired	Minor Adverse
Wind conditions are 2-steps windier than those desired	Moderate Adverse
Wind conditions are 3-steps windier than those desired	Major Adverse

- 13.60 In line with Lawson's overall methodology, strong winds are reported separately from the comfort assessment and do not form part of the significance criteria. These winds, with the potential to affect pedestrian safety, are not assigned a scale of effect and therefore overall significance but, are reported separately. This is due to the fact that any strong wind exceedance is considered to be significant regardless of its scale.

- 13.61 Potential adverse effects that are assessed as minor, moderate and major effects are all considered to be significant. In other words, they would require mitigation in order for local conditions to become suitable for the intended use of the area. For instance, if the wind conditions at a particular location are intended for standing purposes, but the modelled wind conditions are identified as being suitable for strolling (in accordance with the Lawson Comfort Criteria described in **Error! Reference source not found.**), the difference between the desired and modelled wind conditions is described as one-step windier than desired. In such case, the potential effect would be identified as being minor adverse (i.e. windier than desired) and significant. Potential beneficial effects that are assessed as minor, moderate and major effects are not considered to be significant.
- 13.62 The 'Mitigation and Monitoring Measures' section of this chapter describes the remedial measures expected to mitigate any adverse effects which have been identified.
- 13.63 The residual effects reported for the demolition and construction phase of the Development are considered to be temporary, whereas effects outlined in the assessment for the completed and occupied Development are considered to be permanent.
- 13.64 In terms of off-site areas, wind conditions are compared to the Baseline Scenario and the intended use. If wind conditions remain consistent or calmer than the Baseline Scenario or remain suitable for the intended use, this would represent a negligible effect. However, if wind conditions - off-Site are windier than the Baseline Scenario and unsuitable for the intended use, the effect would be significant and adverse. Wind conditions off-site will only be classified as beneficial if wind conditions were not suitable for the intended use in the Baseline Scenario and are improved to be calmer than required for the intended use with the Completed Development. If conditions are windier than the baseline, but remain suitable for the intended use, this would remain a negligible effect.

Baseline Conditions

- 13.65 For the assessment of the Baseline Conditions, the wind tunnel model included the Existing Site with Existing Surrounding Buildings and Existing Landscaping (Configuration 1).
- 13.66 Figure 13.3 and 13.4 show the windiest and summer seasons results for the Baseline Scenario at ground level respectively. Figure 13.5 presents the annual safety exceedances.

Pedestrian Comfort

- 13.67 During the windiest season, wind conditions on thoroughfares, car parks and pedestrian crossings range from suitable for sitting to strolling use. Wind conditions at entrances and bus stops range from sitting to standing use.
- 13.68 In the summer season wind conditions are generally one category calmer. As such, the wind conditions on the Site and in the surrounding area range from sitting to standing use.

Strong Winds

- 13.69 There are no instances of strong winds exceeding the 15m/s safety threshold for more than 2.2 hours per year identified within the Baseline Scenario.

Likely Significant Effects

Demolition/Construction Phase

- 13.70 As a standard practice for wind microclimate assessments in London, the likely significant effects for the demolition and construction phases of the development have been reached using professional judgement. As construction progresses, wind conditions at the Site would be expected to gradually adjust from those at the existing Site to those of the Development in the context of the existing surrounding buildings (Configuration 2). As such, it would be expected that conditions during the demolition and construction phase would be suitable for a working construction site or pedestrian thoroughfares around the Site (with the hoarding in place), however, off-Site thoroughfares (without hoarding) would be gradually windier than suitable for the intended use and would therefore require wind mitigation measures. Refer to paragraph 13.109 for the mitigation measures that are expected to create a suitable wind environment during the construction phase. The likely effect on-Site is expected to be negligible and no design and/or management measures are considered necessary during the demolition and construction phase of the Development, however, off-Site conditions would represent a minor adverse (significant) effect and there would be instances of strong winds.

Operational Phase

- 13.71 The assessment presented below has been undertaken based on Configuration 2: The Development with Existing Surrounding Buildings. Figures 13.6 and 13.7 for the windiest and summer seasons respectively, and in Figure 13.8 for the summer season at elevated levels. Figures 13.9 and 13.10 present locations with strong winds exceedances for this configuration.

Pedestrian Comfort

- 13.72 Wind conditions in and around the Development in the context of the existing surroundings would range from suitable for sitting to walking use during the windiest season.
- 13.73 During the summer season, wind conditions are either the same category or one category calmer than those during the windiest season and would range from suitable for sitting to walking use.

Thoroughfares

On-Site

- 13.74 Wind conditions on thoroughfares within the Development would range from suitable for sitting to walking use during the windiest season.
- 13.75 Probe locations 13, 15, 16, 25, 28, 29, 70, 71, 73, 78, 80, 81, 95, 96, 98, 99, 101, 103, 107 (refer to Figure 13.6) would be suitable for standing use and thus corresponds to a minor beneficial (not significant) effect.
- 13.76 Probe locations 39, 58, 90, 93, 94, 105 and 106 (Figure 13.6) would be suitable for strolling use and would represent a negligible (not significant) effect.
- 13.77 Probe locations 45, 61, 91 and 104 (Figure 13.6) would be suitable for walking use during the windiest season. This would represent a minor adverse (significant) effect.

Off-Site

- 13.78 Wind conditions at the majority of off-site thoroughfares (represented by probe locations 5, 7, 10, 11, 14, 17, 19, 21, 23, 27, 30, 34, 36, 37, 41, 44, 52 and 67) would be suitable for the intended strolling use or calmer during the windiest season. Wind conditions at these locations would represent a negligible (not significant) effect. The exception to these would be probe locations 46, 54, 59, 62 and 68, which would be one category windier than suitable for thoroughfare use and therefore correspond to a minor adverse (significant) effect. These locations would therefore require mitigation to improve wind conditions as discussed in paragraph 13.111.

Entrances

On-Site

- 13.79 Wind conditions at entrances to the Development would range from suitable for standing to walking use.
- 13.80 Entrances at probe locations 8, 12, 26, 76 and 77 would be suitable for standing use and would represent a negligible (not significant) effect.
- 13.81 Entrances at probe locations 9, 51 and 53 would be suitable for strolling use and would represent a minor adverse (significant) effect. These entrances would therefore require mitigation as discussed in paragraph 13.111.
- 13.82 Entrances at probe locations 40 and 60 would be suitable for walking use and would represent a moderate adverse (significant) effect. These entrances would therefore require mitigation as discussed in paragraph 13.111.
- 13.83 The adverse wind conditions at entrances (probe locations 9, 40, 51, 53 and 60) would require mitigation to provide localised shelter. This is discussed further in the mitigation section below.

Ground Floor Amenity – Mixed Use

Off-Site

- 13.84 Wind conditions at ground level amenity spaces represented by probe locations 4, 20 and 33 would be suitable for sitting use during the summer season. This would represent a negligible (not significant) effect.

Podium Level Amenity – Mixed Use

On-Site

- 13.85 Wind conditions at podium level amenity space would range from suitable for sitting to strolling use during the summer season.

- 13.86 Probe locations 118 and 122 - 123 would be suitable for sitting use and would represent a negligible (not significant) effect. Probe locations 106 - 108, 110, 111, 116, 117, 119, 125 - 128 and 130 would be suitable for standing use and thus corresponds to a negligible (not significant) effect.
- 13.87 Probe locations 112, 131 and 133 would be suitable for strolling use, representing a minor adverse (significant) effect.
- 13.88 Note that any designated seating would have to be located in areas which would be suitable for sitting use during the summer season. Seating located in areas suitable for standing use would require localised shelter to represent a negligible effect.

Podium Level Amenity – Seating

On-Site

- 13.89 Wind conditions at podium level seating areas would range from suitable for sitting to strolling use during the summer season.
- 13.90 Probe location 121 would be suitable for sitting use and would represent a negligible (not significant) effect.
- 13.91 Probe locations 105 and 109 would be suitable for strolling use and would thus be two categories windier than suitable for sitting use. This would represent a moderate adverse (significant) effect.
- 13.92 Probe locations 113, 120, 124, 129 and 132 would be suitable for standing use and would therefore represent a minor adverse (significant) effect.
- 13.93 These locations would require mitigation as discussed in paragraph 13.111.

Roof Terraces and Balconies

On-Site

- 13.94 Wind conditions at balconies (represented by probe locations 143, 146 – 149, 152, 153, 155 and 157) would be suitable for sitting to standing use during the summer season. This would represent a negligible (not significant) effect.

- 13.95 Wind conditions at roof terraces would range from suitable for standing to walking use during the summer season.
- 13.96 Probe locations 138, 141, 154 and 156 would be suitable for standing use and would thus correspond to a negligible (not significant) effect.
- 13.97 Probe locations 139, 140, 142, 144, 145 and 150 would be suitable for strolling use and would represent a minor adverse (significant) effect.
- 13.98 Probe locations 134 – 137 and 151 would be suitable for walking use representing a moderate adverse (significant) effect. The accessible amenity spaces would require mitigation as discussed in paragraph 13.111.
- 13.99 Roof terraces at probe locations 114, 115, 138, 139, 150 and 151 would not be accessible and would therefore not require mitigation as these terraces would only be accessed for maintenance use.
- 13.100 Wind mitigation measures to improve adverse wind conditions at roof terraces (probe locations 134 – 137, 140, 142, 144 and 145) have been suggested under the Mitigation section below.

Crossings

Off-Site

- 13.101 Wind conditions at off-site crossings would range from suitable for standing to walking use. This would represent a negligible (not significant) effect.

Bus Stops and Railway Station

Off-Site

- 13.102 Wind conditions on the Syon Lane railway station platforms (probe location 1) would be suitable for sitting use during the windiest season. This would represent a negligible (not significant) effect.
- 13.103 Wind conditions at bus stop probe location 66 would be suitable for standing use during the windiest season and would thus represent a negligible (not significant) effect.

Strong Winds

- 13.104 Strong winds exceeding the 15m/s threshold for more than 2.2 hours per year would occur at probe locations 40, 54, 59 - 63, 65, 68, 91, 92, 104, 112, 131, 134 - 137, 140, 144, 145 for up to 32.7 hours per year. Strong winds at these locations would be a potential safety concern for pedestrians at these locations and therefore mitigation measures would be required.
- 13.105 Wind conditions at probe locations 115, 150 and 151 would also exceed the safety threshold, although these locations would not be accessible other than for maintenance purposes where cyclists and more vulnerable pedestrians would not be present. It would be expected that in the event of strong winds (during windy days) maintenance works would follow safety protocols and would not be using these spaces. As such no mitigation measures would be required.

Limitations and Assumptions

- 13.106 It is assumed that the Development massing submitted for approval (changes made in July 2020 following the wind tunnel test (see paragraph 13.31) to Buildings A, C, D and E) would not give rise to different likely significant wind effects as the massing changes did not constitute increase in height and only focused on the addition of balconies. The introduction of open inset balconies to Building A would generally result in a wind environment that is likely to be suitable for standing use during the summer season, as these balconies are recessed into the building façade and would be sheltered from the prevailing wind direction.
- 13.107 The replacement of recessed balconies with projected balconies on the western and eastern elevations of Buildings C, D and E would be expected to remain calm and suitable for the intended standing use during the summer season. This is as the projection of these balconies occurs in an area where conditions at worst would be suitable for standing use with the inclusion of landscaping during the summer season.
- 13.108 The massing layout changes to Buildings B1, B2 and B3 would be considered minor, however, the introduction of projecting balconies with railing type balustrade at the building corners would likely give rise to significant wind effects. These balconies would be expected to be windier than suitable for pedestrian use and would require additional mitigation as recommended qualitatively below in paragraph 13.112.

Mitigation Measures

Construction Phase

13.109 Areas of the Development under construction would be surrounded by solid hoarding until the point where the building becomes occupied. All wind mitigation measures would need to be in place prior to the completion and occupation of the Development. At off-Site windy locations to the north of the Site, along the pedestrian footpath and Great West Road, the copse of 5.5m – 6.5m tall trees around the northern corner of the Development at ground level would need to be in place before the cladding surfaces are installed. In addition, the solid balustrade, screens and trees situated on the northern edge of the podium would be required as the podium construction is complete. The details of these mitigation measures are discussed in paragraph 13.111.

Operational Phase

13.110 The following areas of the Development would require wind mitigation measures for:

Pedestrian Comfort:

On-Site:

- Thoroughfares:
 - Near the Development corners (probe locations 45, 61, 91 and 104).
- Entrances:
 - Probe locations 9, 40, 51, 53 and 60.
- Podium Amenity Spaces:
 - Probe locations 105, 109, 112, 120, 124, 129, 131 and 133.
- Roof Terrace Amenity:
 - Probe locations 134 – 137, 140, 142, 144 and 145.
- Balconies (based on updated final design):
 - Probe location 171.

Off-Site:

- Thoroughfares:
 - Probe locations 46, 54, 59, 62 and 68.
- Bus Stops (based on updated final design):
 - Probe location 66.

*Strong Winds:**On-Site:*

- Thoroughfares:
 - Probe locations 61, 91 and 104.
- Entrances:
 - Probe locations 40 and 60.
- Podium Amenity Spaces:
 - Probe locations 112 and 131
- Roof Terrace Amenity:
 - Probe locations 134 – 137, 140, 144 and 145.

Off-Site:

- Thoroughfares:
 - Probe locations 54, 59, 62 and 68.
- Pedestrian Crossings:
 - Probe location 63.
- Roadways:
 - Probe locations 65 and 92.

13.111 The wind microclimate of the original design was initially assessed without landscaping to provide a worst-case scenario. Due to the presence of strong winds and windier than suitable

conditions within and around the Development a wind mitigation workshop was undertaken to develop mitigation measures through an iterative wind tunnel testing process with the inclusion of the proposed landscaping of the updated final design evolution. The following mitigation measures were incorporated into the proposed landscaping to achieve a safe wind microclimate:

- Probe locations 40, 45, 46, 53 and 54 – Changed the semi-mature deciduous trees clustered to the north-west corner of Building A to coniferous trees 5.5m to 6.5m tall with the southern most tree removed and the addition of a solid 2m deep canopy wrapping around the Tesco superstore entrance 6m above ground level;
- Entrance location 51 – Recess or draught lobby instalment to provide interior to exterior transition;
- Entrance locations 60 and 61 – Five multi-stem umbrella trees changed to 5.5m – 6.5m tall semi-mature deciduous trees to the north of Building B1, a solid canopy wrapped around the north-east corner of Building B1 (2m in depth, 3m above ground) and recess or draught lobby instalment to provide interior to exterior transition area;
- Probe locations 59 and 62 – Three semi-mature deciduous trees 6m tall (including height of planter) at least 5m to the north of Building B1 (between probe locations 59 and 62);
- Probe locations 104 – The lowest balcony slab on western elevation of Building C1 extended to meet south-western corner and entrances to be recessed or draught lobby instalment to provide interior to exterior transition;
- Probe locations 59, 62, 63, 65, 68 and 133 – Four northern-most trees at podium level between Building A and Building B changed from deciduous to coniferous with the inclusion of 1.5m high balustrade along the north edge. In addition, six 4m high by 1.5m wide solid screens with 3m high coniferous trees between them in two rows along the northern edge of podium between Building A and Building B;
- Probe locations 91 and 92 – Existing landscaping to the south-east of the Development and a solid screen 2.5m in height and 2.5m wide placed parallel to the southern building façade to the east of the most south-eastern corner of Building B3;
- Probe location 112, 124, 129, 131 and 132 – The proposed landscaping at podium level would improve wind conditions at those locations;

- Probe locations 140, 142, 144 and 145 – Solid balustrade 1.1m high along the perimeter of roof terraces;
- Probe locations 134 – 137 – Solid 2m deep canopy on three Building A terraces at 3.2m above terrace floor level and solid balustrade 1.1m high along each terrace set back by 2m from the edge. In addition, solid 2m high screen bisecting the terraces in half;
- Probe locations 115, 150 and 151 – Roof terraces would be inaccessible for occupants where cyclists and more vulnerable pedestrians would not be present. It would be expected that in the event of strong winds (during windy days) maintenance works would follow safety protocols and would not be using these spaces. As such no mitigation measures would be required; and
- Probe locations 105, 109 and 120 – The addition of soft or hard landscaping elements at least 1.5m high at two sides of each designated seating area would be expected to provide effective localised shelter.

13.112 Note that with these mitigation measures in place, outstanding comfort exceedances at probe locations 45, 59, 62, 66 and 171 would persist and would require further mitigation. These exceedances would be resolved at a later detailed design stage.

Residual Effects

13.113 The assessment of the wind mitigation measures has been undertaken based on the Mitigation: The Development with Landscaping, Wind Mitigation and the Existing Surrounding Buildings scenarios. This is presented in Figures 13.16 and 13.17 for the windiest and summer seasons respectively, and in Figure 13.18 for the summer season at elevated levels. Figures 13.19 and 13.20 present locations with strong winds exceedances for this configuration.

13.114 With these wind mitigation measures in place, all safety exceedances would be eliminated, however outstanding comfort exceedances would persist and would be resolved at a later detailed design stage. The majority of locations would therefore have negligible or minor beneficial residual effects, with the exception of probe locations 45, 59, 62, 66 and 171, which would have minor adverse residual effects. Additional wind mitigation measures would be required to improve wind conditions and resolve these exceedances and will be carried out at a later detailed design stage. Wind tunnel testing of the Development to quantitatively assess wind mitigation measures will be secured through an appropriately worded planning condition.

Pedestrian Comfort

- 13.115 Wind conditions in and around the Development in the context of the existing surroundings with the proposed landscaping and wind mitigation measures would range from suitable for sitting to walking use during the windiest season.
- 13.116 During the summer season, wind conditions are either the same category or one category calmer than those during the windiest season and would range from suitable for sitting to walking use.

Thoroughfares

On-Site

- 13.117 Wind conditions on thoroughfares within the Development would range from suitable for sitting to walking use during the windiest season.
- 13.118 Probe locations 13, 16, 75, 78, 80 and 94 would be suitable for sitting use and therefore represent a moderate beneficial (not significant) effect.
- 13.119 Probe locations 24-26, 28, 29, 39, 58, 70, 71, 73, 81, 90, 95, 96, 98, 99, 101 and 103 would be suitable for standing use and thus corresponds to a minor beneficial (not significant) effect.
- 13.120 Probe locations 61, 91, 93 and 104 would be suitable for strolling use and would represent a negligible (not significant) effect.

Off-Site

- 13.121 Wind conditions at off-site thoroughfares (represented by probe locations 5, 7, 10, 11, 14, 17, 19, 21, 23, 27, 30, 34, 36, 37, 41, 44, 46, 52, 54, 67 and 68) would be suitable for the intended strolling use or calmer during the windiest season. Wind conditions at these locations would represent a negligible (not significant) effect.
- 13.122 Probe locations 59 and 62 would be one category windier than suitable for the intended use during the windiest season and would represent a minor adverse (significant) effect.

Entrances

On-Site

- 13.123 Wind conditions at entrances to the Development would range from suitable for standing to strolling use during the windiest season.
- 13.124 Entrances at probe locations 12 and 53 would be suitable for sitting use and would represent a minor beneficial (not significant) effect.
- 13.125 Entrances at probe locations 51, 60, 76 and 77 would be suitable for standing use and would represent a negligible (not significant) effect.
- 13.126 Entrances at probe locations 8, 9 and 40 would be suitable for strolling use. These conditions would represent a negligible (not significant) effect due to the use of draught lobbies to provide a gradual transition from the windy exterior condition to the calm interior conditions.

*Ground Floor Amenity – Seating and Mixed Use**On-Site*

- 13.127 Wind conditions at ground level designated seating areas represented by probe locations 15 would be suitable for sitting use during the summer season. This would represent a negligible (not significant) effect.
- 13.128 Designated seating at probe location 45 would be one category windier than suitable and would thus represent a minor adverse (significant) effect.

Off-Site

- 13.129 Wind conditions at ground level amenity spaces represented by probe locations 4, 20 and 33 would be suitable for sitting use during the summer season. This would represent a negligible (not significant) effect.

*Podium Level Amenity – Mixed Use**On-Site*

- 13.130 Wind conditions at podium level amenity space would range from suitable for sitting to strolling use during the summer season.

13.131 Probe locations 106, 107, 110, 112, 113, 117-119, 121, 122, 124, 126, 128, 129, 131 and 132 would be suitable for sitting use and would represent a negligible (not significant) effect. Probe locations 111, 127 and 133 would be suitable for standing use and thus corresponds to a negligible (not significant) effect.

Podium Level Amenity – Seating

On-Site

13.132 Wind conditions at podium level seating areas would be suitable for sitting use during the summer season which would represent a negligible (not significant) effect.

Roof Terraces and Balconies

On-Site

13.133 Wind conditions at balconies (represented by probe locations 149, 152, 153, 155, 157-170, 172-183 and 186) would be suitable for sitting to standing use during the summer season. This would represent a negligible (not significant) effect. Wind conditions at probe location 171 would be one category windier than suitable for balcony use and would represent a minor adverse (significant) effect. This is for all balcony levels within this stack, as wind speeds increase with height and the wind assessment was made on the highest balcony, thus representing the worst wind conditions.

13.134 Wind conditions at accessible to the occupants roof terraces would range from suitable for sitting to standing use during the summer season and would thus correspond to a negligible (not significant) effect.

13.135 Roof space at probe locations 114, 115, 138, 139, 150 and 151 would not be accessible for occupants where cyclists and more vulnerable pedestrians would not be present. It would be expected that in the event of strong winds (during windy days) maintenance works would follow safety protocols and would not be using these spaces. As such no mitigation measures would be required.

Crossings

Off-Site

13.136 Wind conditions at off-site crossings would range from suitable for standing to walking use.

This would represent a negligible (not significant) effect.

Bus Stops and Railway Station

Off-Site

13.137 Wind conditions on the Syon Lane railway station platforms (probe location 1) would be suitable for sitting use during the windiest season. This would represent a negligible (not significant) effect.

13.138 Wind conditions at bus stop probe location 66 would be one category windier than suitable during the windiest season and would thus represent a minor adverse (significant) effect.

Strong Winds

13.139 No instance of strong winds exceeding 15m/s for more than the 2.2 hours per year threshold would occur in the context of existing surrounding building with the updated final proposed landscaping and wind mitigation measures.

Cumulative Effects

Demolition/Construction Phase

13.140 The Cumulative Developments would not be likely to have a material impact on the wind microclimate at the Site. Therefore, wind conditions during the construction works at the Site and surrounding area would be expected to be similar to that discussed for the Development in the context of the existing surrounding buildings as the microclimate gradually adjusts to that of the Development in the context of the cumulative surrounding buildings. These conditions would be expected to represent a likely negligible (not significant) effect on-Site and a minor adverse (significant) effect off-Site.

Operational Phase

13.141 The assessment presented below includes the Development with Cumulative Surrounding Buildings (Configuration 3). Figures 13.11 and 13.12 for the windiest and summer seasons respectively, and in Figure 13.13 for the summer season at elevated levels. Figures 13.14 and 13.15 report the annual strong winds exceedances for this configuration.

Pedestrian Comfort

13.142 In the context of cumulative surrounding buildings, the wind environment would be similar to that in the context of the existing surrounding buildings, with strong winds persisting at ground, podium and terrace levels.

13.143 The cumulative surrounding building to the west of the Development would provide localised shelter to Northumberland Avenue, however, the majority of the Site wind conditions would remain similar to those in Configuration 2 during the windiest season.

13.144 During the summer season, amenity spaces would have similar wind conditions to those with the existing surrounding buildings in place.

Thoroughfares

On-Site

13.145 Wind conditions on thoroughfares within the Development would range from suitable for sitting to walking use during the windiest season.

13.146 Probe locations 75, 80 and 100 would be suitable for sitting use and would represent a moderate beneficial (not significant) effect.

13.147 Probe locations 13, 15, 16, 24, 25, 28, 29, 70, 71, 73, 78, 81, 95, 96, 98, 99, 101 and 103 would be suitable for standing use and thus corresponds to a minor beneficial (not significant) effect.

13.148 Probe locations 39, 58, 90, 93 and 94 would be suitable for strolling use and would represent a negligible (not significant) effect.

13.149 Probe locations 45, 61, 91 and 104 would be suitable for walking use during the windiest season. This would represent a minor adverse (significant) effect. These locations would require mitigation as discussed in paragraph **Error! Reference source not found.**

Off-Site

13.150 Wind conditions at the majority of off-site thoroughfares (represented by probe locations 5, 7, 10, 11, 14, 17, 19, 21, 23, 27, 30, 34, 36, 37, 41, 44, 46, 52, 54 and 67) would be suitable for the intended strolling use or calmer, representing a negligible (not significant) effect. Probe location 59, 62 and 68 would be one category windier than suitable for thoroughfare use and therefore correspond to a minor adverse (significant) effect. These locations would

require mitigation as discussed in paragraph **Error! Reference source not found..**

Entrances

On-Site

- 13.151 Wind conditions at entrances to the Development would range from suitable for standing to walking use.
- 13.152 Entrances at probe locations 8, 12, 26, 76 and 77 would be suitable for standing use and would represent a negligible (not significant) effect.
- 13.153 Entrances at probe locations 9 and 51 would be suitable for strolling use and would represent a minor adverse (significant) effect.
- 13.154 Entrances at probe locations 40 and 60 would be suitable for walking use and would represent a moderate adverse (significant) effect.
- 13.155 The adverse wind conditions at entrances (probe locations 9, 40, 51 and 60) would require mitigation to provide localised shelter.

Ground Floor Amenity – Mixed Use

Off-Site

- 13.156 Wind conditions at ground amenity spaces at probe locations 4, 20 and 33 would be suitable for sitting use during the summer season. This would represent a negligible (not significant) effect.

Podium Level Amenity – Mixed Use

On-Site

- 13.157 Wind conditions at podium level amenity space would range from suitable for sitting to strolling use during the summer season.
- 13.158 Probe locations 118 and 122 - 123 would be suitable for sitting use and would represent a negligible (not significant) effect. Probe locations 106 - 108, 110, 111, 116, 117, 119, 120, 124 - 130 and 132 would be suitable for standing use and thus corresponds to a negligible

(not significant) effect.

13.159 Probe locations 105, 109, 112, 131 and 133 would be suitable for strolling use and would represent a minor adverse (significant) effect.

13.160 Note that any designated seating should only be located in areas which would be suitable for sitting use during the summer season.

Podium Level Amenity – Seating

On-Site

13.161 Wind conditions at podium level seating areas would range from suitable for sitting to strolling use during the summer season.

13.162 Probe location 121 would be suitable for sitting use and would represent a negligible (not significant) effect.

13.163 Probe locations 113, 120, 124, 129 and 132 would be suitable for standing use and would therefore represent a minor adverse (significant) effect.

13.164 Probe locations 105 and 109 would be suitable for strolling use and would thus be two categories windier than suitable for sitting use. This would represent a moderate adverse (significant) effect.

13.165 These locations would require mitigation in the form of soft or hard elements located at two sides to provide localised shelter. Alternatively, relocating the designated seating areas to locations suitable for sitting use.

Roof Terraces and Balconies

On-Site

13.166 Wind conditions at balconies (represented by probe locations 143, 146 – 149, 152, 153, 155 and 157) would be suitable for sitting to standing use during the summer season. This would represent a negligible (not significant) effect.

13.167 Wind conditions at roof terrace levels would range from suitable for standing to walking use during the summer season.

- 13.168 Probe locations 138, 141, 154 and 156 would be suitable for standing use and would thus correspond to negligible (not significant) effect.
- 13.169 Probe locations 134, 139, 140, 142, 144, 145 and 150 would be suitable for strolling use and would represent a minor adverse (significant) effect.
- 13.170 Probe locations 135 – 137 and 151 would be suitable for walking use representing a moderate adverse (significant) effect. The accessible amenity spaces would require mitigation as discussed in paragraph 13.111.
- 13.171 Roof terraces at probe locations 114, 115, 138, 139, 150 and 151 would be accessible only to be used for maintenance use and would therefore not require mitigation.
- 13.172 Wind mitigation measures which have been suggested to improve adverse wind conditions at roof terraces (probe locations 134 – 137, 139, 140, 142, 144 and 145) for the Development in the context of the existing surrounding building would be expected to remain valid for the Development in the context of the cumulative surrounding buildings.

Crossings

Off-Site

- 13.173 Wind conditions at off-site pedestrian crossings would range from suitable for standing to walking use. This would present a negligible (not significant) effect.

Bus Stops and Railway Station

Off-Site

- 13.174 Wind conditions on the Syon Lane railway station platform (probe location 1) would be suitable for sitting use during the windiest season. This would represent a negligible (not significant) effect.
- 13.175 Wind conditions at bus stop probe location 66 would be suitable for standing use during the windiest season and would thus represent a negligible (not significant) effect.

Strong Winds

13.176 Strong winds exceeding the 15m/s threshold for more than 2.2 hours per year would occur at probe locations 115 and 151 for up to 29 hours per year, however, as these locations would be accessible for maintenance use only, no further mitigation would be required.

Mitigation Measures

13.177 Wind conditions at the Development in the context of the cumulative surrounding buildings would be similar to those in the context of the existing surrounding buildings, with strong winds persisting at ground, podium and terrace levels prior to the development of wind mitigation measures.

13.178 The wind mitigation measures detailed above in paragraph 13.111 for the Development in the context of existing surrounding buildings would remain valid and necessary in the context of the cumulative surrounding buildings. Implementation of these measures would result in a wind environment safe for the intended use with no instances of strong winds in accessible areas, however comfort exceedances would likely persist at the locations discussed in the context of existing surrounding buildings at probe locations 45, 59, 62, 66 and 171.

Summary

13.179 The meteorological data for the Site indicates prevailing winds from the south-west quadrant throughout the year with secondary winds from the north-east direction which are more prevalent during the spring months.

13.180 In the Baseline Scenario (Configuration 1), during the windiest season, wind conditions on thoroughfares within and around the Site range from suitable for sitting to strolling use. Wind conditions at surrounding entrance locations, bus stops and railway stations have conditions suitable for sitting to standing use. Generally, wind conditions are one category calmer during the summer season and therefore range from suitable for sitting to standing use. There are no instances of strong winds at the existing Site.

13.181 During the construction phase (with the hoarding in place) conditions would be suitable for a working construction site, however, Off-Site thoroughfares (without hoarding) to the north and south of the Development would be gradually windier than suitable for the intended use and would therefore require wind mitigation measures.

13.182 With the introduction of the Development (Configuration 2), ground floor locations close to the corners of the Development (particularly at the north-eastern corner on Great West Road) would exceed the 15m/s safety threshold for more than 2.2 hours per year, which would be

a potential safety concern for cyclists and more vulnerable pedestrians. There would be eight locations with instances of strong winds at podium and roof terrace amenity spaces. Wind mitigation would be required to reduce the occurrence of strong winds to make these areas safe for pedestrian use. During the windiest season, thoroughfares around the corners of the Development would be one category windier than suitable for thoroughfare use. Entrances to the Development from the north, northern corners and south-western corner would be one category windier than suitable for entrance use. During the summer season, wind conditions at podium and roof terrace amenity spaces would be up to two categories windier than suitable for the intended use. All balcony locations would be suitable for the intended use.

13.183 Wind mitigation measures have been developed including the addition of balustrades to most roof terraces and canopies to the roof terrace of Building A, four trees at the podium level between Buildings A and B with a balustrade added to the northern edge along with five vertical screens with coniferous trees between them. A solid canopy wrapped around the Tesco superstore entrance with corpse of evergreen trees clustered to the north-west corner of the Site and the inclusion of a solid screen to the trolley stand. Most windy entrances would install a draught lobby to provide interior to exterior transition, which would improve wind conditions and achieve a wind microclimate suitable for the intended use. With these mitigation measures in place, wind conditions at the majority of thoroughfares would be suitable for the intended use except at probe locations 59 and 62 which would be one category windier than suitable. The off-Site bus stop at probe location 66 would also be one category windier than suitable and would require further mitigation. Entrances, crossings and car parks would range from suitable for sitting to walking use during the windiest season suitable for the intended use. During the summer season, the majority of amenity spaces would be suitable for the intended use. The exception to this would be at seating locations to the north-west of the Development (probe location 45) and stack of balconies at the north-west elevation of Building B2, which would require mitigation in the form of soft or hard landscaping elements.

13.184 At the Development in the context of cumulative surrounding buildings, the wind environment would be similar to that for the Development in the context of the existing surrounding buildings, with strong winds persisting at ground, podium and terrace levels. To the north of the Development (probe location 54) winds would no longer exceed the safety threshold. During the windiest season, the cumulative building to the west of the Development would provide localised shelter to Northumberland Avenue, however, wind conditions around the majority of the Site would remain similar to those in Configuration 2. During the summer season, the majority of amenity spaces would have similar wind conditions to those with the existing surrounding buildings in place. The exception to this would be at probe location 134, which would be calmer than in Configuration 2, however, these conditions would remain

windier than suitable for amenity use and would therefore require wind mitigation. Incorporating the wind mitigation measures discussed above, would likely improve wind conditions on-Site and off-Site such that the majority of locations would be safe for the intended use. The exception to this would be at locations discussed in the context of existing surrounding buildings at probe locations 45, 59, 62, 66 and 171, which will be addressed at a later detailed design stage.

13.185 Table 13.3 contains a summary of the likely significant effects of the Development.

Table 13.3: Table of Significance – Wind Microclimate

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	B	L	
Construction											
No Effect	Temporary	Negligible to Minor Adverse	Copse of evergreen trees 5.5m to 6.5m high in addition to the proposed landscaping and solid balustrade, screens and trees situated on the northern edge of the podium.							X	Negligible
Completed Development											
Thoroughfares	Permanent	Minor Beneficial to Minor Adverse	Copse of evergreen trees 5.5m to 6.5m high in addition to the proposed landscaping. Additional mitigation measures required at a later detailed design stage for probe location 59 and 62.							X	Minor Beneficial to Negligible
Entrances	Permanent	Negligible to Moderate Adverse	Recess entrance by 1.5m or draught lobby to be installed to provide interior to exterior transition. Canopies to the north-west and south-west elevations.							X	Minor Beneficial to Negligible
Ground Floor Amenity	Permanent	Negligible to Minor Adverse	Additional mitigation measures required at a later detailed design stage for probe location 45.							X	Negligible
Roof Terraces	Permanent	Negligible to Moderate Adverse	Balustrade at least 1.1m high and canopies 2m deep.							X	Negligible

Podium Level	Permanent	Negligible to Minor Adverse	Solid balustrade 1.5m high, six solid screens 4m high by 1.5m wide and coniferous trees in between at the northern edge of the podium.								X	Negligible
Crossings	Permanent	Negligible	N/A								X	Negligible
Balconies	Permanent	Negligible to Minor Adverse	Additional mitigation measures required at a later detailed design stage for probe location 171.								X	Negligible
Bus Stops and Railway Station	Permanent	Minor Beneficial to Negligible	Additional mitigation measures required at a later detailed design stage for probe location 66.								x	Minor Beneficial to Negligible
Cumulative Effects												
Construction												
No Effect	Temporary	Negligible to Minor Adverse	Copse of evergreen trees 5.5m to 6.5m high in addition to the proposed landscaping and solid balustrade, screens and trees situated on the northern edge of the podium.								x	Negligible
Operation												
Thoroughfares	Permanent	Minor Beneficial to Minor Adverse	Copse of evergreen trees 5.5m to 6.5m high in addition to the proposed landscaping. Additional mitigation measures required at a later detailed design stage for probe locations 59 and 62.								X	Minor Beneficial to Negligible

Entrances	Permanent	Negligible to Moderate Adverse	Recess entrance by 1.5m or draught lobby to be installed to provide interior to exterior transition. Canopies to the north-west and south-west elevations.								X	Minor Beneficial to Negligible
Ground Floor Amenity	Permanent	Negligible	Additional mitigation measures required at a later detailed design stage for probe location 45.								X	Negligible
Roof Terraces	Permanent	Negligible to Moderate Adverse	Balustrade at least 1.1m high and canopies 2m deep.								X	Negligible
Podium Level	Permanent	Negligible to Minor Adverse	Solid balustrade 1.5m high, six solid screens 4m high by 1.5m wide and coniferous trees in between at the northern edge of the podium.								X	Negligible
Crossings	Permanent	Negligible	N/A								X	Negligible
Balconies	Permanent	Negligible	Additional mitigation measures required at a later detailed design stage for probe location 171.								X	Negligible
Bus Stops and Railway Station	Permanent	Minor Beneficial to Negligible	Additional mitigation measures required at a later detailed design stage for probe location 66.								x	Minor Beneficial to Negligible

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; L = Local

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