

Technical Note for the 50 Clarendon Road Planning Appeal

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Our client	Skybridge Properties		
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1. Introduction

1.1 Background and intent

- 1.1.1 Ashton Fire has been appointed by Skybridge Properties to provide fire safety consultancy on the proposed mixed-use development at 50 Clarendon Road, Watford, WD17 1TX.
- 1.1.2 This document is with regards to the fire safety strategy developed for the proposed development and intends to assist the Planning Inspectors for the scheme in understanding the chronology of key events following relating to fire safety and submission of the planning application.
- 1.1.3 Together with the above, this document also intends to provide context on the Health and Safety Executive (HSE) substantive response, including addressing the HSE's comments through responses, and design amendments through the introduction of two stair design for the residential buildings that have a top floor height of more than 18m above ground.
- 1.1.4 Reference is made to the Core Documents List (CDL) for documents referred to in this document.

1.2 Building description

- 1.2.1 The project is a single building that consists of multiple single stair residential cores and an office demise arranged in a horseshoe layout and set over a shared basement level.
- 1.2.2 The residential areas will comprise a 24-storey tower (B, G+22) rising up to a top floor height of 69m above ground, with other residential areas served by separate cores that extend for 6 storeys (B, G+4), each with a top floor height of less than 18m above ground level.
- 1.2.3 A separate office demise will also be provided within the building rising to 7 storeys above ground and provided with two stairs.

- 1.2.4 Since the initial planning submission on 8th April 2022, a review of the proposed design has been undertaken to investigate the feasibility of adding a second stair in the 24-storey residential tower in later stages of design.

2. Summary of key events and fire safety input

2.1 Timeline

- 2.1.1 Ashton Fire were commissioned to support the development of a fire strategy for the planning application with the documentation submitted summarised below together with a timeline of key changes in fire safety regulations and guidance:

- 2021, Aug: Implementation of the Gateway 1 process.
- 2021, Oct: BSI consultation of the draft update to BS 9991:2021 (still in draft).
- 2022, Apr: Planning application submitted for the project to Watford Borough Council.
- 2022, Dec: DLUHC consultation placing a 30m height limit for single stair residential design.
- 2023, Jul: Government announcement for intent to limit single stair residential design to 18m.

2.2 Documents issued and fire safety guidance

- 2.2.1 The documentation which was submitted by Ashton Fire in support of the planning application are summarized below with Core Documents List (CDL) references provided also:

- Fire Safety Statement (Issue 2), see CDL 17.1;
- Fire Safety Mark-ups and Comments (Issue 5), see CDL 17.2; and
- Tall Buildings Qualitative Design Review (Issue 1), see CDL 17.3.

- 2.2.2 Following the original submission documents were updated to incorporate design amendments and additional discussion for concerns raised over the provision of Electric Vehicles (EVs) within the building car park as summarized below:

- Fire Safety Mark-ups and Comments (Issue 6), see CDL 17.4; and
- Tall Buildings Qualitative Design Review (Issue 3), see CDL 17.5.

- 2.2.3 The current legislation applicable to fire safety design within the UK are the Building Regulations 2010 (as amended). British Standard BS 9991:2015 was adopted as the principal fire safety design guidance for the residential areas, and British Standard BS 9999:2017 for the non-residential areas.

- 2.2.4 As of the time of writing this document, the guidance adopted for the scheme are still current and conclusive outcomes from the BSI and DLUHC consultations yet to be published. The legislation that requires to be satisfied by the fire strategy developed is the Building Regulations (2010) as amended which is not impacted by the draft amendments to BS 9991 or DLUHC consultation at the time this document was written.

- 2.2.5 However, the project team took a decision to explore the feasibility of implementing a second stair in the residential areas having a floor more than 18m above ground. On 24th of July 2023, the UK Home Secretary announced the government's intention to deploy further changes to residential fire safety design by suggesting a reduced height limit for single stair design of 18m. Though this is not currently enforced, reviewed architectural layouts demonstrate that featuring a second stair in the high-rising tower can be accommodated and thus, further safeguarding the proposed design.

- 2.2.6 Furthermore, though there is currently limited guidance on the fire safety design on buildings incorporating EVs, additional fire safety considerations and risk mitigation factors were implemented for the project.

- 2.2.7 The next sections of this document intend to provide context over the Health and Safety Executive (HSE) response to the Gateway 1 planning process for items pertaining to land use, and project design amendments aiming to address HSE concerns and incoming changes to fire safety guidance and legislation.

3. HSE Substantive Response

3.1 Dialogue with the HSE

- 3.1.1 The HSE issued their substantive response (see CDL 17.7) on the 14th June 2022. To which responses were provided by Ashton Fire in a document issued on the 20th June 2022 (see CDL 17.6).
- 3.1.2 The HSE responses to this with an advisory note to the local planning authority (see CDL 17.8), dated 5th July 2023 and highlighting outstanding concerns.
- 3.1.3 These included areas of non-compliance with the fire safety guidance in BS 9991, primarily relating to single stair design, which are summarised below:
- Connections of the single stair with a basement level;
 - Connection of the single stair with ancillary accommodation (e.g. car park, store rooms); and
 - Extended single directional travel distances in common corridors greater than 15m.
- 3.1.4 The solutions available within the industry to address non-compliances with standard fire safety guidance, such as those listed above, are well established. Engineered solutions adopt fundamental principles of fire science and fire dynamics which require to be demonstrated as adequate in order to satisfy the functional requirements of the Building Regulations 2010 (as amended).
- 3.1.5 For situations such as those listed in Section 3.1.3, these typically involve the provision of mechanical smoke ventilation systems as a smoke control measure, with the performance of these systems assessed using Computational Fluid Dynamics (CFD) analysis to demonstrate design adequacy. CFD analysis is a model of fire-driven fluid flow that numerically solves a form of the Navier-Stokes equations appropriate for low speed, thermally driven flow with an emphasis on smoke and heat transport from fires. CFD models offer a high level of sensitivity in the analyses carried out, based on user-selected input parameters to define a fire, building-specific geometries, and physical properties to assess the performance of the smoke ventilation systems proposed for the project.
- 3.1.6 Annex A of BS 9991:2015 discusses the employment of a mechanical smoke ventilation system for residential common corridors where there are extended travel distances and, though a departure from standard guidance, includes reference to the relevant documents setting out the framework and acceptance criteria for carrying out such performance-based solutions that adopt CFD analysis.
- 3.1.7 To support extended travel distances, or where mechanical smoke ventilation systems are provided within a protected lobby separating a single escape route from ancillary areas to support the connection, CFD modelling requires specific input parameters such as the specific corridor / lobby geometry, and vent types and locations. The outcomes of the CFD analysis demonstrate whether tenability criteria, such as limits set for visibility, temperature, toxicity levels, etc. can be achieved, but which are sensitive to the specific input parameters. Therefore, this process is typically undertaken in later design stages after the planning process, following design freeze of corridor and flat layouts. Based on prior experience on similar arrangements, the proposed infrastructure to assist with demonstrating tenable conditions are met include proposal of an appropriate smoke ventilation system (e.g. mechanical), siting of extract and supply-air shafts, and identifying locations where this approach would need to be implemented at an early design stage.
- 3.1.8 This was discussed in the Ashton Fire comments to the HSE's substantive response. However, the HSE maintains that their concerns with regards to Means of Escape and Fire Service Access and Facilities have not been resolved (Sections 1.3-1.12, and Sections 1.13-1.18 respectively).

3.1.9 Responses were provided by Ashton Fire to the HSE via email on the 25th July 2023 addressing the above. Response from the HSE was that they would not review or respond to the clarifications offered by Ashton Fire and that a meeting could be scheduled by the LPA.

3.2 Proposed solutions to HSE comments

3.2.1 A summary of proposed solutions to the HSE's outstanding concerns for Means of Escape and Fire Service Access and Facilities is provided in the sections below:

- **1.3-1.6:** It is acknowledged that a single stair core descending to a basement level and which is provided with connections to ancillary areas forms a departure from the adopted guidance. This is not disputed, however, an alternative approach has been proposed in order to support such an arrangement which would offer improved circulation, access and functionality of the core. This would be in the form of an engineered solution, comprising of a protected lobby provided with a mechanical smoke ventilation system offering separation between the stair and adjacent areas with CFD modelling to demonstrate the protection to the stair is adequate (see Sections 4.1.4 - 4.1.6). Section 0.7 in BS 9991:2015 also acknowledges that fire engineered solutions are sometimes an approach that is necessitated by the building design, where this is to suggest that a fire engineered solution does not translate to a 'less safe' form of design. In contrast, these solutions are forced to undergo a far higher level of scrutiny and employ conservatism that may go beyond the minimum safety measures proposed in standard guidance.
- **1.3-.16:** Furthermore, the addition of a secondary stair to the high-rising residential tower would permit for one of the two stairs to continue down to a basement level, where accessed through a ventilated lobby if the other is terminated at ground level. It is considered appropriate that the original package of fire protection measures suggested for the low-rising single stair (<18m above ground) to be maintained in support of it connecting to the basement level and ancillary areas. This would be via lobby separation provided with a mechanical smoke ventilation system and assessed using CFD modelling in the next stages of design as part of a bespoke solution with the aim to demonstrate design adequacy following the principles within the Smoke Control Association (SCA) guidance and PD 7974 suite of documents.
- **1.7-1.8:** Extended single directional travel distances greater than 15m within residential common corridors are not a rarity, with there being well established means of demonstrating adequate performance of fire safety systems protecting the escape routes (such as mechanical smoke ventilation), as acknowledged in Annex A of BS 9991:2015. CFD modelling will be required to be carried out to support the proposed arrangement in the next stages of design as discussed above. Appropriate infrastructure, in the form of smoke shafts and inlet air supplies have been factored into the design at this stage to mitigate the risk of land use consideration being affected. It is to be noted that limitations are placed on travel distances, where these are not to exceed 30m in a single direction as a means of safeguarding against physiological stress for firefighters conducting operations with smoke-filled corridors.

3.3 HSE comments deemed to have been addressed

3.3.1 In their most recent substantive response, the HSE did not clarify the precise points from each of the Means of Escape, and Fire Service Access and Facilities sections for which they have outstanding concerns, following the response from Ashton Fire (see CDL 17.6). As such, it is considered that multiple comments raised by the HSE have been addressed to a satisfactory degree by Ashton Fire.

3.3.2 Given no further clarity has been provided on which precise comments the HSE would seek to see further discussion and/or modifications to, these comments which Ashton Fire deem to have been adequately addressed are further addressed below:

- **1.9:** Travel distances within the office demises are fully compliant with the travel distance limits recommended within BS 9999:2017 given there are multiple directions of escape. The 30m distance referred to by the HSE is discussed above, and is suggested as a limitation for escape in a single direction (specifically in residential corridors as per PD 7974-5).
- **1.10-1.12:** There are a few inconsistencies that have been noticed in these comments with regards to these being raised as matters of concern and the reasoning behind them:
 - there is no guidance suggesting that it is inappropriate for refuse stores to be accessed from internally within the building, where this is typically also necessitated to meet travel distances for occupants to the refuse stores;
 - inner room conditions are addressed, where these belong to the non-residential demises that are designed to BS 9999:2017 which does not define a car park as a place of special fire hazard; and
 - the basement floor plans clearly indicate that one of the two office stairs terminates at the ground floor level so it is unclear as to why this has been raised as a concern.
- **1.13:** Multiple firefighting shafts are only recommended within residential or office buildings that have a top floor more than 18m above ground level and a floor area greater than 900m² in the fire safety guidance. The proposed office floors have a floor area of approximately 703m² and hose laying distances measures from the firefighting shaft to the furthest part of the floor within 60m on a route suitable for laying hose. Thus, the arrangements are compliant with the guidance in BS 9999:2017. It is acknowledged that the HSE raise this comment to be 'prudent'. However, this is not considered to pose a risk to design, or future land use given the solution already meets the fire safety guidance.
- **1.14:** It is noted that the comment on the single-stair tower having a firefighting lift extend to the basement level would be resolved by the proposed solution noted for Points 1.3-1.6.
- **1.15-1.17:** Comments discuss the provision of a wet rising main for the high-rising residential tower given it has a top floor height exceeding 50m above ground floor. This has been proposed within the fire strategy developed, with expectations for the wet riser inlet / replenishment point to be within 18m of the fire service access route also already discussed in the deliverables issued by Ashton Fire.
- **1.18:** The comment suggests that fire service vehicle access to the stairs is excessive, measuring at approximately 30m from the fire service vehicle access route. In accordance with the recommendations in BS 9991:2015 and BS 9999:2017, fire service access should be within 18m of the dry/wet riser inlet points and not directly measured to the stair. Landscaping arrangements for the scheme accommodate suitable access for a fire service vehicle to enter the courtyard to access Stairs 3 and 5 (provided with fire mains) as well as suitable turning facilities to avoid the vehicles from having to reverse more than 20m. Stair 4 is not provided with a fire main and is not considered necessary to be provided with access to as per the expectations in BS 9991:2015.

3.3.3 It is also worth noting that the Gateway 1 process is intended for High Risk Residential Buildings (HRRB) that are deemed to be buildings with a top floor height of more than 18m above ground or a storey count of more than 7 storeys above ground. The extent of review at Gateway 1 is intended to pertain to land use issues, where there are HSE multiple comments that raise concern with detailed design items which would not be possible to have fully developed solutions at this current stage of design.

4. Design Changes

- 4.1.1 As discussed in Section 2.2.5, the government's intention to mandate a second stair in residential buildings with a top floor more than 18m above ground floor was announced on 25th July 2023 by the Secretary of State.
- 4.1.2 Moreover, the regulatory process for Gateway 2 is expected to be in place within the year 2023, and the implementation of the Building Safety Regulator (BSR) shortly thereafter.
- 4.1.3 Though this is separate from the current planning application, and with all adopted fire safety codes and standards still current, the project team has opted to prepare for incoming regulatory changes and amendments to fire safety guidance by exploring the opportunity for adding a second stair to buildings in the proposed scheme with a floor height of more than 18m above ground.
- 4.1.4 This applies to the high-rising residential tower having a top floor height of approximately 69m above ground. The amended plans indicate how such changes can be accommodated, where the alternative stair core will be facilitated by the secondary stair already shown to serve the office demise. The proposed approach results in a shared escape route providing a secondary escape route from two different demises. In doing so, fire safety measures will be provided to safeguard this connection between two demises, each provided with alternative exits, envisaged to include independent smoke ventilation systems, and suitable access to evacuation lifts for each residential core.
- 4.1.5 Detailing of proposed solutions remain to be finalized in the next stages of design, following frozen plans of the updated layouts to incorporate fire safety strategy recommendations made by Ashton Fire for the Building Regulations approvals process.
- 4.1.6 In addition to futureproofing the project and adding robustness to the scheme, the option of the amended design also addresses multiple concerns raised by the HSE without having to opt for a performance-based solution. Fire engineered solutions in some circumstances are considered to offer a higher level of robustness in design, due to the scrutiny these will undergo in review and process of demonstrating that conservative assumptions and acceptance criteria are met.
- 4.1.7 Such solutions are likely to still be required in the scheme in the form of CFD modelling to support extended single directional travel distances in residential corridors and various non-residential to residential connections.
- 4.1.8 The proposed amended layouts are attached in Appendix A.