

Axis House  
242 Bath  
Road  
Heathrow  
UB3 5AY

## Daylight/Sunlight and Overshadowing Assessment

November  
2021



Ref: 21-8678

Rev A

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|               |                 |
|---------------|-----------------|
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## 1. Executive Summary

Syntegra Consulting Ltd has been appointed by Syntegra Consulting to prepare a Daylight and Sunlight assessment in order to examine the impact of the proposed new development on Bath Road onto the neighbouring developments on Doghurst Avenue. The study covers the erection of a hotel building comprising of 157 rooms with associated access, parking and landscaping.

The following can be concluded based on the studies undertaken:

- **Vertical Sky Component (VSC):** Specific windows have been selected alongside the properties on Doghurst Avenue. The study indicates that there is no impact.
- **Annual/Winter Probable Sunlight Hours (APSH):** Specific windows have been selected alongside the properties on Doghurst Avenue. The study indicates that there is no impact.

Therefore, the proposed scheme will not have a negative impact on these properties and it can be considered compliant.

## 2. Introduction

### 2.1. Background

Syntegra Consulting Ltd has been appointed by Syntegra Consulting to prepare a Daylight and Sunlight assessment in order to examine the impact of the proposed new development on Bath Road onto the neighbouring developments on Doghurst Avenue. The study covers the erection of a hotel building comprising of 157 rooms with associated access, parking and landscaping.

The Building Research Establishment (BRE) sets out good practice daylight and sunlight guidance in BR209 “*Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice*”, 2<sup>nd</sup> Ed, guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings. This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the British Standard BS8206-2:2008 and the *Applications Manual on Window Design* of the Chartered Institution of Buildings Services Engineers (CIBSE).

Daylight and sunlight calculations have been carried out in accordance with BR209.

### 2.2. The Nature and Effect of Daylight

The provision of daylight is as important as ensuring low levels of noise or low levels of odour in maintaining the enjoyment of one’s property. Adequate levels of daylight are important not only to light and heat the home, but also for an occupant’s emotional well-being.

Daylight is widely accepted to have a positive psychological effect on human beings and there is a great deal of evidence to suggest that people who are deprived of daylight are more susceptible to depression and mood swings. This is common in northern countries, such as Norway, Iceland, and Canada where daylight is scarce during the winter months.

### 2.3. Daylighting Simulation Model

We have proposed the following methodology in order to examine all required parameters:

- Prepare a 3D model using IES <VE> 2021 to understand and visualize the existing and the proposed scenario.
- Carry out a daylight assessment using the methodologies set out in by BRE and British Standard Guidelines for diffuse daylight and sunlight conditions in order to determine the VSC (Vertical Sky Component).
- Carry out a sunlight assessment using the methodologies set out in by BRE and British Standard Guidelines for diffuse daylight and sunlight conditions in order to determine the A/WPSH (Annual / Winter Probable Sunlight Hours).

## 2.4. Description of Development

The study covers a Daylight, Sunlight and Overshadowing assessment in order to examine the impact of the proposed new development on Bath Road, Heathrow onto the neighbouring developments on Doghurst Avenue.

Figure 1 below details the existing site plan, while figure 2 indicates the proposed one.

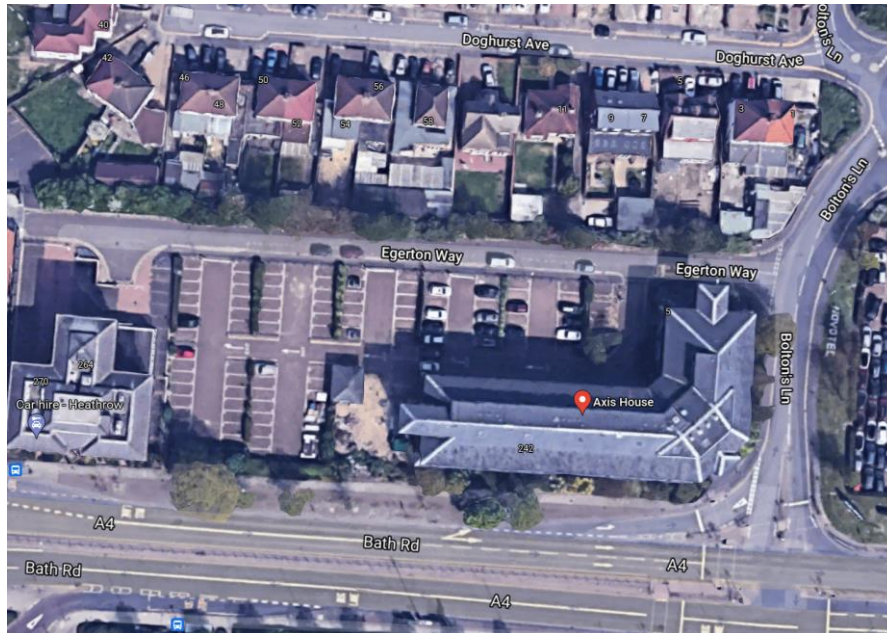


Figure 1 – Existing Site Plan

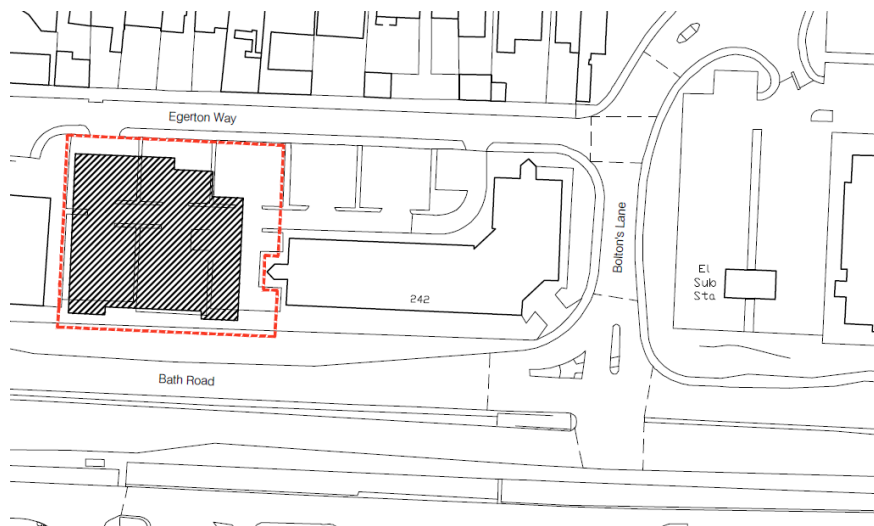


Figure 2 - Proposed Site Plan

### 3. Methodology – Assessment Criteria

The Daylight and Sunlight Assessment, analysed in this report, has been carried out in compliance with the methodology outlined in the Building Research Establishment (BRE) Guide 'Site Layout Planning for Sunlight and Daylight: A Guide to Good Practice' by P J Littlefair (2011).

When assessing the effects of proposed building projects on the potential to cause issues relating to light, it is important to recognise the distinction between daylight and sunlight. Daylight is the combination of all direct and indirect sunlight during the daytime, whereas sunlight comprises only the direct elements of sunlight. On a cloudy or overcast day, diffused daylight still shines through windows, even when sunlight is absent.

Care should also be taken when the development is situated to the south of existing buildings, as in the northern hemisphere, the majority of the sunlight comes from the south. In the UK (and other northern hemisphere countries) south-facing facades will, in general, receive most sunlight, while north-facing facades will receive few sunlight hours during winter months, specifically early mornings and late evenings.

Please see below brief description of each criterion assessed.

#### Vertical Sky Component (VSC) – Proposed and existing scenario

The Vertical Sky Component (VSC) quantifies the amount of available daylight received at a particular window and measured on the outer pane of the window. This is the ratio, expressed as a percentage, of the direct illuminance falling on a reference point (usually the centre of the window) to the simultaneous horizontal illuminance under an unobstructed sky (overcast sky conditions).

In order to maintain good levels of daylight the BRE guidance recommends that the VSC of a window should be 27% or greater.

The comparison test considers the VSC results of the baseline/existing condition and the VSC results assuming that the new development is in place. The 2011 BRE Handbook states that where the proposed VSC is less than 27%, the comparison with the existing situation should be analysed and if the VSC is less than 0.8 times its former value, occupants of the existing building may notice a reduction in the amount of daylight.

#### Annual Probable Sunlight Hours (APSH) - Proposed and existing scenario

BRE guidance recommends that the APSH received at a given window in the proposed case should be at least 25% of the total available.

The comparison test considers the APSH results of the existing and proposed development in place. The BRE guidance say that if the reduction in sunlight between the existing and the proposed one results in an APSH and of at least 0.8 times its former value, then it is considered that the sunlight received is adequate.

Table 1 below summarizes all criteria examined.

| Parameter                             | Acceptability Criteria                                                                                                                                                                                                                                                                               |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vertical Sky Component (VSC)          | <p>If VSC is at least 27% then examined window design is compliant</p> <p>Or</p> <p>Reduction ratio of &lt;1 and &gt;or= of 0.8</p> <p>Minor adverse - &lt;0.8 and &gt;or=0.7</p> <p>Moderate adverse - &lt;0.7 and &gt;or=0.6</p> <p>Major adverse - &lt;0.6</p>                                    |
| Annual Probable Sunlight Hours (APSH) | <p>APSH received at a given window in the proposed case should be at least 25% of the total available</p> <p>Or</p> <p>Reduction ratio of &lt;1 and &gt;or= of 0.8</p> <p>Minor adverse - &lt;0.8 and &gt;or=0.7</p> <p>Moderate adverse - &lt;0.7 and &gt;or=0.6</p> <p>Major adverse - &lt;0.6</p> |

**Table 1 - Overall Guidance/methodology assessment**

All the information has been taken directly from digital files provided by Syntegra Consulting. Proposed development heights have been taken from architectural drawings, while surrounding buildings details from Google maps and on approximation.

For the daylight and sunlight assessment, a full-size 3D model of the existing area, including existing buildings and neighbouring properties was constructed in IES <VE> 2021. Figure 3 below demonstrates the existing modelled site plan while figure 4 the proposed modelled one. Finally figure 5 demonstrates window reference for easier interpretation of the results.

Please see below modules used for each analysis within IES <VE> 2021 software.

VSC – Radiance module

A/WPSH – SunCast module

Overshadowing – SunCast module

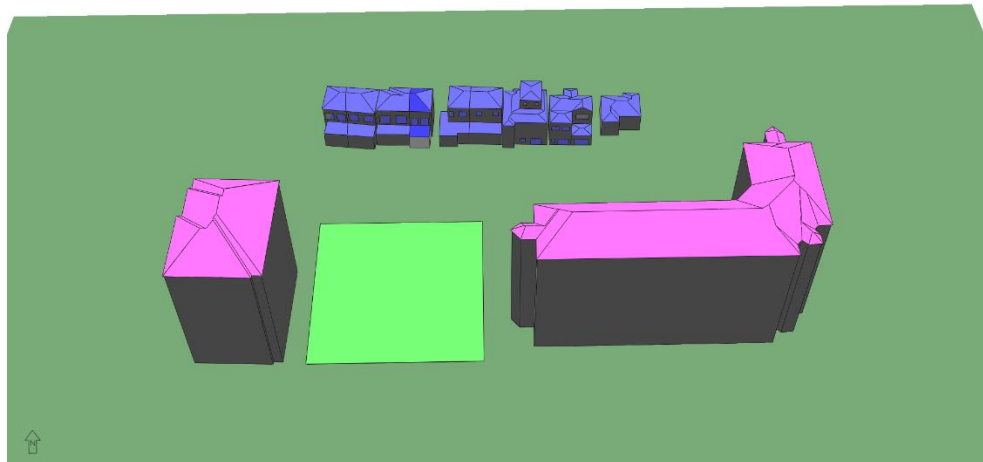


Figure 3 - Existing site plan modelled using IES <VE>2021

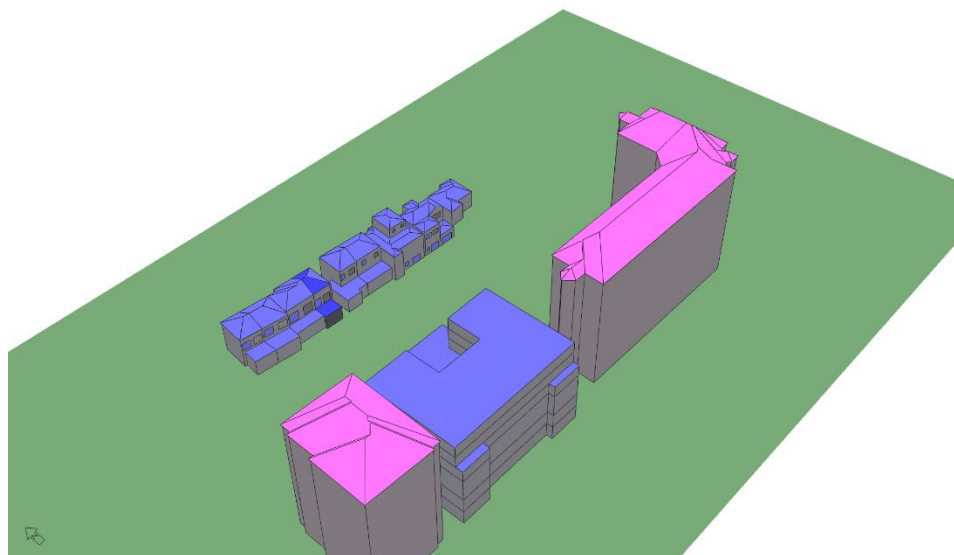


Figure 4 - Proposed site plan modelled using IES <VE>2019

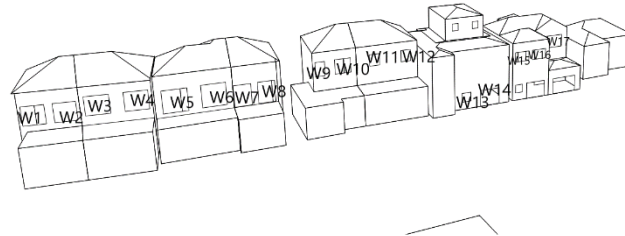


Figure 5 - Window reference on Doghurst Avenue

## 4. Results

### Vertical Sky Component (VSC)

The assessment of VSC demonstrates that there is no impact between the VSC available to the windows analysed on the existing and the proposed scenario. Please see below Table 2 illustrating the window ID reference for easier interpretation of the results.

| Vertical Sky Component (VSC) - Axis House |              |              |                              |            |
|-------------------------------------------|--------------|--------------|------------------------------|------------|
| Window ID                                 | Existing VSC | Proposed VSC | minimum 0.8 ratio difference | Compliance |
| W1                                        | 34.67        | 30.81        | 0.888664551                  | PASS       |
| W2                                        | 33.95        | 29.96        | 0.882474227                  | PASS       |
| W3                                        | 33.85        | 29.45        | 0.870014771                  | PASS       |
| W4                                        | 34.14        | 29.31        | 0.858523726                  | PASS       |
| W5                                        | 31.96        | 27.55        | 0.862015019                  | PASS       |
| W6                                        | 33.09        | 28.01        | 0.846479299                  | PASS       |
| W7                                        | 32.79        | 27.77        | 0.846904544                  | PASS       |
| W8                                        | 32.42        | 27.65        | 0.8528686                    | PASS       |
| W9                                        | 32.46        | 28.04        | 0.863832409                  | PASS       |
| W10                                       | 31.89        | 28.61        | 0.897146441                  | PASS       |
| W11                                       | 31.97        | 28.64        | 0.89583985                   | PASS       |
| W12                                       | 30.84        | 28.04        | 0.90920882                   | PASS       |
| W13                                       | 26.32        | 22.15        | 0.84156535                   | PASS       |
| W14                                       | 27.74        | 24.03        | 0.866258111                  | PASS       |
| W15                                       | 28.9         | 26.53        | 0.91799308                   | PASS       |
| W16                                       | 28.64        | 26.23        | 0.915851955                  | PASS       |
| W17                                       | 25.56        | 24.66        | 0.964788732                  | PASS       |

Table 2 - VSC% Results

## Annual Probable Sunlight Hours (APSH)

BRE guidance recommends that the APSH received at a given window in the proposed case should be at least 25% of the total available.

Table 3 below indicates that the proposed development will have no impact on the neighbouring properties on Doghurst Avenue.

| Annual Probable Sunlight Hours (APSH) - Axis House |           |          |          |          |             |            |
|----------------------------------------------------|-----------|----------|----------|----------|-------------|------------|
| Window ID                                          | APSH >25% |          | WPSH >5% |          | APSH Ratio  | Compliance |
|                                                    | Existing  | Proposed | Existing | Proposed |             |            |
| W1                                                 | 68.44     | 61.99    | 24.79    | 19.19    | 0.905756867 | PASS       |
| W2                                                 | 69.17     | 63.78    | 24.61    | 20.97    | 0.922076045 | PASS       |
| W3                                                 | 67.27     | 60.98    | 25.64    | 18.49    | 0.906496209 | PASS       |
| W4                                                 | 67.19     | 61.44    | 26.37    | 18.87    | 0.914421789 | PASS       |
| W5                                                 | 63.95     | 57.82    | 22.92    | 16.79    | 0.904143862 | PASS       |
| W6                                                 | 58.48     | 51.69    | 23.25    | 16.46    | 0.883891929 | PASS       |
| W7                                                 | 62.84     | 56.53    | 20.49    | 14.17    | 0.899586251 | PASS       |
| W8                                                 | 63.6      | 57.15    | 21.58    | 15.12    | 0.898584906 | PASS       |
| W9                                                 | 60.2      | 56.66    | 20.33    | 14.70    | 0.941196013 | PASS       |
| W10                                                | 61.77     | 55.48    | 19.8     | 15.61    | 0.898170633 | PASS       |
| W11                                                | 62.37     | 57.37    | 20.26    | 15.27    | 0.919833253 | PASS       |
| W12                                                | 57.88     | 53.72    | 18.63    | 14.46    | 0.92812716  | PASS       |
| W13                                                | 54.22     | 46.77    | 16.7     | 9.24     | 0.862596828 | PASS       |
| W14                                                | 47.26     | 41.01    | 14.36    | 8.10     | 0.867752857 | PASS       |
| W15                                                | 57.86     | 52.93    | 15.97    | 11.04    | 0.914794331 | PASS       |
| W16                                                | 56.68     | 52.34    | 15.84    | 11.50    | 0.923429781 | PASS       |
| W17                                                | 46.35     | 44.06    | 11.58    | 9.29     | 0.950593312 | PASS       |

Table 3 - APSH Results

## 5. Conclusion

The study covers the erection of a hotel building comprising of 157 rooms with associated access, parking and landscaping.

The following can be concluded based on the studies undertaken:

- **Vertical Sky Component (VSC):** Specific windows have been selected alongside the properties on Doghurst Avenue. The study indicates that there is no impact.
- **Annual/Winter Probable Sunlight Hours (APSH):** Specific windows have been selected alongside the properties on Doghurst Avenue. The study indicates that there is no impact.

**Therefore, the proposed scheme will not have a negative impact on these properties and it can be considered compliant.**