# **150 HOLBORN** Planning addendum

**DAYLIGHT & SUNLIGHT AMENITY WITHIN THE SITE** JULY 2017









14 June 2017

# Daylight and Sunlight Amenity Within The Site

# 150, High Holborn

Project No: 5538



| Client         | DAH Real Estate sarl              |
|----------------|-----------------------------------|
| Architect      | Perkins + Will                    |
| Project Title  | 150, High Holborn                 |
| Project Number | 5538                              |
| Report Title   | Internal Daylight and Sunlight Ar |
| Dated          | 14 June 2017                      |
|                | ·                                 |
|                | 1                                 |

| Prepared by | JF       |
|-------------|----------|
| Checked by  | ML       |
| Туре        | Planning |
|             |          |

| Revisions | Date:  | Notes: | Signed: |
|-----------|--------|--------|---------|
|           | <br>// |        |         |
|           |        |        |         |
|           |        |        |         |
|           |        |        |         |
|           |        |        |         |

| finformatior | 1: |
|--------------|----|
| IR45_553     | 8  |
| 7_5538_DSI   | D  |

## menity Within The Site

GIA, The Whitehouse, Belvedere Road, London SE18GA t 02072021400 f 02072021401 e mail@gia.uk.com www.gia.uk.com



#### **EXECUTIVE SUMMARY** 1.

The purpose of this report is to ascertain whether the residential component of the proposed development at 150 High Holborn will offer acceptable accommodation in terms of daylight and sunlight amenity.

The site faces the typical constraint of a central London location, namely the dense urban fabric which restricts the daylight and sunlight availability. Furthermore, the main aspect of the site is north-facing and therefore the sunlight availability is limited to the early morning and late afternoon in the summer.

In order to address these constraints, GIA has worked alongside the design team to optimise the daylight amenity and as a consequence most rooms achieve daylight levels in line with guidance, which is a good result for a scheme located in such a densely built urban environment.

The rooms falling short of recommendation are either located on the lowest floors, where the obstruction caused by the surrounding buildings is greatest, or below balconies which reduce the sky visibility. The shortfalls are therefore a consequence either of the site's location or of the provision of private amenity areas.

With most rooms achieving good levels of daylight despite the restricted sky visibility, we believe the design of the proposed scheme has made the most of the daylight available and so the proposed accommodation will offer acceptable daylight amenity for a scheme located in central London.

Due to the main aspect of the site being north-facing, the results of the sunlight assessments show levels below those recommended, however these are a consequence of the site's orientation rather than of the design.

#### INTRODUCTION AND OBJECTIVE 2.

GIA has been instructed to provide a report upon the potential availability of Daylight and Sunlight to the proposed accommodation within the residential scheme prepared by Perkins + Will. GIA was specifically instructed to carry out the following:

- by Perkins + Will.
- Carry out a sunlight assessment using the methodologies set out in the BRE guidance for Annual Probable Sunlight Hours (APSH) to the fenestration facing within 90° of due south.
- · Carry out an overshadowing assessment using the methodology set out in the BRE guidance for Sun Hours On Ground (SHOG) for all relevant amenity areas.
- · Prepare a report setting out the analysis and our findings.

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD Issue No: IS5-5538 Page No: 3 Date: 14 June 2017

To create a 3D computer model of the proposal based upon drawings prepared

· Carry out a daylight assessment using the methodologies set out in the BRE guidance for Average Daylight Factor, No-Sky Line and Room Depth Criterion.

#### 3. BRE GUIDELINES

The Building Research Establishment (BRE) have set out in their handbook Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (2011), 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 Building Services Engineers (CIBSE).

The guide also provides advice on site layout planning to determine the quality of daylight and sunlight within open spaces between buildings.

It is important to note, however, that this document is a guide whose stated aim "is to help rather than constrain the designer".

The document provides advice, but also clearly states that it "is not mandatory and this document should not be seen as an instrument of planning policy." The report acknowledges also in its introduction that "in special circumstances the developer or planning authority may wish to use different target values. For example, in a historic City centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."

It is an inevitable consequence of the built up urban environment that daylight and sunlight will be more limited in these areas. It is well acknowledged that in such situations there may be many other conflicting and potentially more important planning and urban design matters to consider other than just the provision of ideal levels of daylight and sunlight.

## 3.1. DAYLIGHT

The BRE set out various methods for assessing the daylight within a proposed building within section 2.1 and Appendix C of the handbook. The summary of this, given at the end of section 2.1 of the guide, states as follows:

"In general, a building will retain the potential for good interior diffused daylighting provided that on all its main faces:

A. No obstruction, measured in a vertical section perpendicular to the main face, from a point two metres above ground level, subtends an angle of more than 25° to the horizontal;

Or

B. If (A) is not satisfied, then all points on the main face on a line two metres above ground level are within four metres (measured sideways) of a point which has a vertical sky line component of 27% or more."

## **3.1.1. VERTICAL SKY COMPONENT (VSC)**

This method of assessment can be undertaken using a skylight indicator or a Waldram diagram. It measures from a single point, at the centre of the window (if known at the early design stage), the quantum of sky visible taking into account all external obstructions. Whilst these obstructions can be either other buildings or the general landscape, trees are usually ignored unless they form a continuous or dense belt of obstruction.

The VSC method is a useful 'rule of thumb' but has some significant limitations in determining the true quality of daylight within a proposed building. It does not take into account the size of the window, any reflected light off external obstructions, any reflected light within the room, or the use to which that room is put. Appendix C of the guide goes into more detail on these matters and sets forward alternative methods for assessment to overcome these limitations.

Paragraph 2.1.21 of the BRE states that:

"Obstructions can limit access to light from the sky. This can be checked by measuring or calculating the angle of visible sky 'theta', angle of obstruction or Vertical Sky Component (VSC) at the centre of the lowest window where daylight is required. If VSC is:

- at least 27% ('theta' is greater than 65°, obstruction angle less than 25°) conventional window design will usually give reasonable results.
- between 15% and 27% ('theta' is between 45° and 65°, obstruction angle between 25° and 45°) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- between 5% and 15% ('theta' is between 25° and 45°, obstruction angle between 45° and 65°) it is very difficult to provide adequate daylight unless very large windows are used.
- less than 5% ('theta' less than 25°, obstruction angle more than 65°) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."

Appendix C of the BRE guide: Interior Daylighting Recommendations, states:

"The British Standard for daylighting, and the CIBSE Applications manual: window design, contain advice and guidance on interior daylighting. This guide to good practice is intended to be used in conjunction with them, and its guidance is intended to fit in with their recommendations.

For skylight, the British Standard and the CIBSE manual put forward three main criteria, based on the average daylight factor, room depth, and the position of the no skyline."

## 3.1.2. AVERAGE DAYLIGHT FACTOR (ADF)

"If a predominantly daylit appearance is required, then adf should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These are minimum values of Average Daylight Factor, and should be attained even if a predominantly daylit appearance is not required."

This method of assessment takes into account the total glazed area to the room, the transmittance quality of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the Vertical Sky Component and the quantum of reflected light off external surfaces.

This is, therefore, a significantly more detailed method of assessment than the Vertical Sky Component method set out above.

## 3.1.3.ROOM DEPTH CRITERION (RDC)

Where it has access to daylight from windows in one wall only, the depth of a room can become a factor in determining the quantity of light within it. The BRE guidance provides a simple method for examining the ratio of room depth to window area. However, whilst it does take into account internal surface reflections, this method also has significant limitations in that it does not take into account any obstructions outside the window and therefore draws no input from the quantity of light entering the room.

## 3.1.4.NO SKY LINE (NSL)

This third method of assessment is a simple test to establish where within the proposed room the sky will be visible through the windows, taking into account external obstructions. The assessment is undertaken at working plane height (850 mm above floor level) and the method of calculation is set out in Appendix D of the BRE handbook.

Appendix C of the BRE handbook states "if a significant area of the working plane lies beyond the no skyline (i.e., it receives no direct skylight), then the distribution of daylight in the room will look poor and supplementary electric lighting will be required." To guarantee a satisfactory daylight uniformity, the area which does not receive direct skylight should not exceed 20% of the floor area, as quantified in the BS 8206 Part2 2008.

## 3.1.5.SUMMARY

The Average Daylight Factor gives a more detailed assessment of the daylight within a room and takes into account the highest number of factors in establishing a quantitative output.

However, the conclusion of Appendix C of the BRE guide states:



"All three of the criteria need to be satisfied if the whole of the room is to look adequately daylit. Even if the amount of daylight in a room (given by the Average Daylight Factor) is sufficient, the overall daylight appearance will be impaired if its distribution is poor."

In most urban areas it is important to recognise that the distribution of daylight within a room may be difficult to achieve, given the built up nature of the environment. Consequently, most local authorities seek to ensure that there is sufficient daylight within the room as determined by the Average Daylight Factor calculation. However, the additional recommendations of the BRE and British Standard for residential accommodation, set out above, ought not to be overlooked.

## 3.2. SUNLIGHT

The BRE provide guidance in respect of sunlight quality for new developments within section 3.1 of the handbook. It is generally acknowledged that the presence of sunlight is more significant in residential accommodation than it is in commercial properties, and this is reflected in the BRE document.

It states, "in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day, but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens where people prefer it in the morning rather than the afternoon."

The BRE guide considers the critical aspects of orientation and overshadowing in determining the availability of sunlight at a proposed development site.

The guide proposes minimizing the number of dwellings whose living room face solely north unless there is some compensating factor such as an appealing view to the north, and it suggests a number of techniques to do so. Further more, it discusses massing solutions with a sensitive approach to overshadowing, so as to maximize access to sunlight.

At the same time it acknowledges that the site's existing urban environment may impose orientation or overshadowing constraints which may not be possible to overcome.

To quantify sunlight access for interiors where sunlight is expected, it refers to the BS 8206-2 criterion of Annual Probable Sunlight Hours. APSH is defined as "the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness at the location in question." In line with the recommendation, APSH is measured from a point on the inside face of the window, should the locations have been decided. If these are unknown, sunlight availability is checked at points 1.6m above the ground or the lowest storey level on each main window wall, and no more than 5m apart. If a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken into account. If a room has two windows on opposite walls, the APSH for each can be added together.

The summary of section 3.1 of the guide states as follows:

"In general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided that:

At least one main window faces within 90° of due south;

and

The centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March. "

In paragraph 3.1.11 the BRE guidance suggests that if a room faces significantly North of due East or West it is unlikely to meet the recommended levels proposed by the BS 8206-2. As such, it is clear that only windows facing within 90° of due south can be assessed using this methodology.

It is also worth noting how paragraph 5.3 of the BS 8206-2 suggests that with regards to sunlight duration "the degree of satisfaction is related to the expectation of sunlight if a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary".



#### METHODOLOGY 4.

In order to undertake the daylight and sunlight assessments set out above, we have prepared a three dimensional computer model and used specialist lighting simulation software.

The three dimensional representation of the proposed development has been modelled using the scheme drawings provided to us by Perkins + Will. This has been placed in the context of its surrounding buildings which have been modelled from survey information, photogrammetry, OS and site photographs. This allows for a precise model, which in turn ensures that analysis accurately represents the amount of daylight and sunlight available to the building facades, internal and external spaces, considering all of the surrounding obstructions and orientation.

## **4.1. SIMULATION ASSUMPTIONS**

Where no values for reflectance, transmittance and maintenance factor were specified by the designer the following values from BS 8206-2:2008, Annex A, tables A.1-A.6 were used for the calculation of Average Daylight Factor values. These values are shown in Table 1.

A light veneer has been assumed for the reflectance value of the internal floor and a 0.85 framing factor has been assumed for the fenestation modules.

| Reflectance values:                             |          | Maintenance factors:                               |
|---|----------|--|
| Surrounding                                     | 0.2      | Triple Low-E (frames modelled)                     |
| Pavement  | 0.2      | Triple Low-E (frames not modelled)                 |
| Grass   | 0.1      | Triple Low-E (inclined, frames modelled)           |
| Water   | 0.1      | Triple Low-E (inclined, frames not modelled)       |
| Yellow brick                                    | 0.3      | Triple Low-E (horizontal, frames modelled)         |
| Red brick                                       | 0.2      | Triple Low-E (horizontal, frames not modelled)     |
| Portland Stone                                  | 0.6      |  |
| Concrete  | 0.4      | Double Low-E (frames modelled)                     |
| Internal walls (light grey)                     | 0.68     | Double Low-E (frames not modelled)                 |
| Internal ceiling (white paint)                  | 0.85     | Double Low-E (inclined, frames modelled)           |
| Internal floor (medium veneer)                  | 0.3      | Double Low-E (inclined, frames not modelled)       |
| Internal floor (light veneer)                   | 0.4      | Double Low-E (horizontal, frames modelled)         |
|   |          | Double Low-E (horizontal, frames not modelled)     |
| Transmittance values:                           |          | Single (frames modelled)                           |
|   |          | Single (frames not modelled)                       |
| Triple glazing:                                 |          | Single (inclined, frames modelled)                 |
| Pilkington K Glass 4/12/4/12/4 Argon filled 90% | Tv= 0.63 | Single (inclined, frames not modelled)             |
|   |          | Single (horizontal, frames modelled)               |
| Double glazing:                                 |          | Single (horizontal, frames not modelled)           |
| Pilkington K Glass 4/16/4 Argon filled 90%      | Tv= 0.75 |  |
|   |          | Double Translucent Low-E (frames modelled)         |
| Single glazing:                                 |          | Double Translucent Low-E (frames not modelled)     |
| Pilkington Optifloat Clear, Annealed, 4mm       | Tv=0.90  | Double Translucent Low-E (inclined, frames modelle |
|   |          | Double Translucent Low-E (inclined, frames not mod |
| Translucent glazing:                            |          | Double Translucent Low-E (horizontal, frames mode  |
| Pilkington Optifloat Opal - 4mm K /16/4mm Opal  | Tv= 0.74 | Double Translucent Low-E (horizontal, frames not m |

Table 1: Typical reflectance, transmittance and maintenance factors

|           | Tv(normal) | A.3 | A.4 | A.5 | A.6  | Tv(total) |
|-----------|------------|-----|-----|-----|------|-----------|
|           | 0.63       | 8   | 1   | 1   | 1    | 0.58      |
|           | 0.63       | 8   | 1   | 1   | 0.85 | 0.49      |
|           | 0.63       | 8   | 2   | 1   | 1    | 0.53      |
|           | 0.63       | 8   | 2   | 1   | 0.85 | 0.45      |
|           | 0.63       | 8   | 3   | 1   | 1    | 0.48      |
|           | 0.63       | 8   | 3   | 1   | 0.85 | 0.41      |
|           | 0.75       | 0   | 1   | 1   | 1    | 0.00      |
|           | 0.75       | õ   | 1   | 1   |      | 0.69      |
|           | 0.75       | õ   | 1   | 1   | 0.85 | 0.59      |
|           | 0.75       | 8   | 2   | 1   | 1    | 0.63      |
|           | 0.75       | 8   | 2   | 1   | 0.85 | 0.54      |
|           | 0.75       | 8   | 3   | 1   | 1    | 0.57      |
|           | 0.75       | 8   | 3   | 1   | 0.85 | 0.48      |
|           |            |     |     |     |      | 0.00      |
|           | 0.9        | 8   | 1   | 1   | 1    | 0.83      |
|           | 0.9        | 8   | 1   | 1   | 0.85 | 0.70      |
|           | 0.9        | 8   | 2   | 1   | 1    | 0.76      |
|           | 0.9        | 8   | 2   | 1   | 0.85 | 0.64      |
|           | 0.9        | 8   | 3   | 1   | 1    | 0.68      |
|           | 0.9        | 8   | 3   | 1   | 0.85 | 0.58      |
|           | 0.74       | 0   | 1   | 1   | 1    | 0.00      |
|           | 0.74       | 8   | 1   | 1   | 1    | 0.68      |
|           | 0.74       | 8   | 1   | 1   | 0.85 | 0.58      |
| d)        | 0.74       | 8   | 2   | 1   | 1    | 0.62      |
| telled)   | 0.74       | 8   | 2   | 1   | 0.85 | 0.53      |
| lled)     | 0.74       | 8   | 3   | 1   | 1    | 0.56      |
| nodelled) | 0.74       | 8   | 3   | 1   | 0.85 | 0.48      |



#### CONCLUSIONS 5.

The site faces the constraint that is typical of a central London location, namely the dense urban fabric which restricts the daylight and sunlight availability. In order to address this constraint, GIA has worked alongside the design team to optimise the daylight and sunlight amenity within the residential accommodation.

### This has resulted in:

· Internal layouts optimised for uniform daylight distribution and for maximum daylight ingress within the living areas, where daylight is regarded as more important;

· Aperture sizes and locations designed according to the room usage and daylight availability on the facades;

• The use of a light finish for the internal and balcony floors in order to maximise the interreflection of light;

· The use of glazed balustrades rather than railings or solid parapets to maximise daylight ingress.

## 5.1. CONCLUSION ON DAYLIGHT

All habitable rooms within the residential element of the scheme have been technically assessed for Average Daylight Factor (ADF), No Sky Line (NSL) and Room Depth Criterion (RDC).

The results show that the daylight amenity has been optimised given the constraints inherent to the site's location and most rooms achieve daylight levels in line with or above guidance.

Where possible, Living/Kitchen/Dining rooms have been designed as dual aspect in order to allow for maximum daylight ingress. As a result, only two living areas and three open plan living/kitchen/dining rooms located on the lowest two floors see ADF levels lower than the 1.5% suggested by BRE for living areas. Three of these rooms, located on the second floor, achieve 1.4% ADF, just marginally below the recommendation for living areas. The two open plan living/kitchen/dining rooms on the third floor fall short of the 2% suggested for rooms including a kitchen but exceed the 1.5% recommended for living areas. These rooms can therefore be considered acceptably daylit living areas. The only single-aspect living/kitchen/dining room on the first floor has been provided with a winter garden for future occupants to enjoy good levels of daylight in their private amenity space throughout the year. All living areas on the fourth and fifth floors see ADF levels in excess of the BRE recommendations.

All bedrooms achieve ADF levels in line with or above guidance. Therefore, all living areas falling short of recommendation discussed above are located within units where the bedrooms will achieve acceptable to very good levels of daylight and as such the flats overall offer access to good levels of daylight.

The levels of NSL are lower than BRE's recommendation in the majority of rooms on

the four lowest floors, where the obstruction caused by the surrounding buildings is greatest. Such levels of sky visibility are typically seen within the dense urban grain of central London but PW's design has taken this constraint into account and strived to achieve acceptable levels of daylight indoors as measured by the ADF metric.

All rooms have been designed with good proportions for optimal daylight distribution, as is demonstrated by the RDC being met in all rooms where it is applicable.

Overall therefore, we believe the design of the proposed scheme has made the most of the daylight available on site and the proposed accommodation will offer acceptable daylight amenity overall, which is a good result for a building located within such a dense urban environment.

## 5.2. CONCLUSION ON SUNLIGHT

The BRE guidance states that sunlight is most appreciated in living areas and the greatest expectation of sunlight is in south facing rooms, therefore an assessment of Annual Probable Sunlight Hours (APSH) should be undertaken on all main windows serving living areas facing within 90 degrees of due south.

Due to the orientation of the site, the main aspect of the residential element of the scheme is north-facing and therefore the main windows serving most of the living areas fall outside the scope of the APSH assessment and the expectation of sunlight will be limited.

The west and east-facing windows, instead, have been assessed. Whilst technically falling within the scope of the assessments, these windows are expected to have limited sunlight potential due to their orientation which means they will receive direct sunlight either in the early morning or in the late afternoon only during the summer months. As expected therefore, the results of the assessments show levels of APSH lower than those suggested.

Balconies further reduce the amount of sunlight reaching the windows located below and behind them by acting as shading devices in the summer. The balconies' balustrades have also been assessed to show that future occupants will be able to enjoy additional sunlight through the use of their private amenity spaces during the summer months.

In conclusion, the sunlight availability to the proposed scheme, whilst technically falling short of recommendation, is in line with expectation for a north-facing site.



Sources of information: IR45\_5538 Rel\_27\_5538\_DSD



Issue No: IS5-5538 Page No: 8 Date: 14 June 2017



5538 - 150, High Holborn

## Internal Daylight Assessment | First Floor

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD



| Room Use    | ADF (%)  | NSL (%)  | RDC   |
|-------------|--|--|---|
|             |  |  |   |
| Bedroom     | 1.0  | 36   | Met   |
| Bedroom     | 1.0  | 25   | N/A   |
| Living Room | 0.8  | 31   | Met   |
| L/K/D       | 1.1  | 58   | N/A   |
| Bedroom     | 1.0  | 26   | Met   |
| Bedroom     | 1.2  | 27   | Met   |
|             | Bedroom<br>Bedroom<br>Living Room<br>L/K/D<br>Bedroom<br>Bedroom | Bedroom1.0Bedroom1.0Living Room0.8L/K/D1.1Bedroom1.0Bedroom1.2 | Bedroom 1.0 36   Bedroom 1.0 25   Living Room 0.8 31   L/K/D 1.1 58   Bedroom 1.0 26   Bedroom 1.2 27 |

Table 2: Assessment Data

Figure 3: Floor Plan

Issue No: IS5-5538 Page No: 9 Date: 14 June 2017



5538 - 150, High Holborn

Internal Daylight Assessment | Second Floor

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD



|             |   | aylight Quantum Distribution of Dayligh                                 |   |
|-------------|---|---|---|
| Room Use    | ADF (%)   | NSL (%)   | RDC   |
|             |   |   |   |
| Bedroom     | 1.2   | 43  | Met   |
| Bedroom     | 1.2   | 31  | N/A   |
| Living Room | 1.4   | 45  | N/A   |
| Bedroom     | 1.3   | 63  | Met   |
| L/K/D       | 1.4   | 70  | N/A   |
| Bedroom     | 1.6   | 44  | Met   |
| L/K/D       | 1.4   | 33  | Met   |
|             | Bedroom<br>Bedroom<br>Living Room<br>Bedroom<br>L/K/D<br>Bedroom<br>L/K/D | Room OseADF (%)Bedroom1.2Bedroom1.4Bedroom1.3L/K/D1.4Bedroom1.6L/K/D1.4 | Room Ose ADF (%) NSL (%)   Bedroom 1.2 43   Bedroom 1.2 31   Living Room 1.4 45   Bedroom 1.3 63   L/K/D 1.4 70   Bedroom 1.6 44   L/K/D 1.4 33 |

Figure 4: Floor Plan

Issue No: IS5-5538 Page No: 10 Date: 14 June 2017



5538 - 150, High Holborn

Internal Daylight Assessment | Third Floor

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD



|             | Daylight Quantum  | Distribution  | of Daylight  |
|-------------|---|---|--|
| Room Use    | ADF (%)   | NSL (%)   | RDC  |
|             |   |   |  |
| Bedroom     | 1.4   | 53  | Met  |
| Bedroom     | 1.5   | 39  | N/A  |
| Living Room | 1.7   | 59  | N/A  |
| Bedroom     | 1.7   | 66  | Met  |
| L/K/D       | 1.8   | 90  | N/A  |
| Bedroom     | 2.3   | 58  | Met  |
| L/K/D       | 1.8   | 44  | Met  |
|             | Room Use<br>Bedroom<br>Bedroom<br>Living Room<br>Bedroom<br>L/K/D<br>Bedroom<br>L/K/D | Daylight QuantumRoom UseADF (%)Bedroom1.4Bedroom1.5Living Room1.7Bedroom1.7L/K/D1.8Bedroom2.3L/K/D1.8 | Daylight QuantumDistributionRoom UseADF (%)NSL (%)Bedroom1.453Bedroom1.539Living Room1.759Bedroom1.766L/K/D1.890Bedroom2.358L/K/D1.844 |

Figure 5: Floor Plan

Issue No: IS5-5538 Page No: 11 Date: 14 June 2017



5538 - 150, High Holborn

Internal Daylight Assessment | Fourth Floor

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD



|             | Daylight Quantum  | Distribution  | of Daylight  |
|-------------|---|---|--|
| Room Use    | ADF (%)   | NSL (%)   | RDC  |
|             |   |   |  |
| Bedroom     | 1.8   | 67  | Met  |
| Bedroom     | 1.8   | 48  | N/A  |
| Living Room | 2.0   | 69  | N/A  |
| Bedroom     | 1.9   | 69  | Met  |
| L/K/D       | 2.4   | 97  | N/A  |
| Bedroom     | 3.0   | 79  | Met  |
| L/K/D       | 2.6   | 61  | Met  |
|             | Room Use<br>Bedroom<br>Bedroom<br>Living Room<br>Bedroom<br>L/K/D<br>Bedroom<br>L/K/D | Daylight QuantumRoom UseADF (%)Bedroom1.8Bedroom1.8Living Room2.0Bedroom1.9L/K/D2.4Bedroom3.0L/K/D2.6 | Daylight QuantumDistributionRoom UseADF (%)NSL (%)Bedroom1.867Bedroom1.848Living Room2.069Bedroom1.969L/K/D2.497Bedroom3.079L/K/D2.661 |

Figure 6: Floor Plan

Issue No: IS5-5538 Page No: 12 Date: 14 June 2017



5538 - 150, High Holborn

Internal Daylight Assessment | Fifth Floor



|             |          | Daylight Quantum | Distribution | of Daylight |
|-------------|----------|------------------|--------------|-------------|
| Room Ref.   | Room Use | ADF (%)          | NSL (%)      | RDC         |
| Fifth Floor |          |                  |              |             |
| 28          | Bedroom  | 2.5              | 93           | Met         |
| 29          | L/K/D    | 3.1              | 60           | N/A         |
| 30          | L/K/D    | 4.5              | 94           | N/A         |
| 31          | Bedroom  | 3.0              | 99           | Met         |
| 31          | Bedroom  | 3.0              | 99           | Met         |

Table 6: Assessment Data





|             |          | Daylight Quantum | Distribution | of Daylight |
|-------------|----------|------------------|--------------|-------------|
| Room Ref.   | Room Use | ADF (%)          | NSL (%)      | RDC         |
| Sixth Floor |          |                  |              |             |
| 32          | Bedroom  | 6.0              | 97           | N/A         |
| 33          | Bedroom  | 2.6              | 68           | Met         |
| 34          | Bedroom  | 2.9              | 83           | Met         |
| 35          | Bedroom  | 7.6              | 100          | N/A         |
| J           |          |                  |              |             |

Figure 8: Floor Plan

Table 7: Assessment Data



5538 - 150, High Holborn

Internal Sunlight Assessment

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD





Figure 9: Annual Probable Sunlight Hours - Total

| tota |                       |
|------|-----------------------|
| 25+  | minimum<br>compliance |
| 23-2 | 5                     |
| 20-2 | 2                     |
| 18-2 | 0                     |
| 15-1 | 7                     |
| 13-1 | 5                     |
| 10-1 | 2                     |
| 8-1  | )                     |
| 5-7  |                       |
| 3-5  |                       |
| 0-2  |                       |

Figure 10: Annual Probable Sunlight Hours - Winter



Issue No: IS5-5538 Page No: 15 Date: 14 June 2017











Figure 11: Annual Probable Sunlight Hours - Total

| 8 | total (9 |                       |  |
|---|----------|-----------------------|--|
|   | 25+      | minimum<br>compliance |  |
|   | 23-25    |                       |  |
|   | 20-22    |                       |  |
|   | 18-20    |                       |  |
|   | 15-17    |                       |  |
|   | 13-15    |                       |  |
|   | 10-12    |                       |  |
|   | 8-10     |                       |  |
|   | 5-7      |                       |  |
|   | 3-5      |                       |  |
|   | 0-2      |                       |  |

Sources of information: IR45\_5538 Rel\_27\_5538\_DSD

Issue No: IS5-5538 Page No: 16 Date: 14 June 2017





## WWW.GIA.UK.COM

•

MAIL@GIA.UK.COM

FAX 020 7202 1401

# TEL 020 7202 1400

•

## CONTACT

## •

## LONDON SE18GA

## BELVEDERE ROAD

## THE WHITEHOUSE

ADDRESS