

# DAYLIGHT & SUNLIGHT REPORT

GROUP STATION MANAGERS OFFICES  
GOODGE STREET UNDERGROUND STATION  
75 TOTTENHAM COURT ROAD  
LONDON W1T 2HF

**JSA Opus**

architecture and design

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## 1. INTRODUCTION

This daylight and sunlight report has been prepared by JSA Opus in support of a planning application to the London Borough of Camden on behalf of Transport for London for the building of a rooftop office extension to the rear of Goodge Street London Underground Station.

The report forms part of a resubmission of the planning application which was withdrawn in December 2006, on the grounds that further study on the potential loss of daylight and sunlight amenities to the surrounding properties on Tottenham Court Road and Tottenham Street should be investigated and addressed in the design of the extension.

JSA Opus have undertaken these analyses in accordance with the BRE recommendations in the document "Site layout planning for Sunlight and Daylight – a guide to good planning" (henceforth referred to as the Guide).

## 2. SOURCES OF INFORMATION

The study was undertaken with reference to survey drawings GODRG01610/11/20/21/22, 01710/11/20/21/30/31/32.

All neighbouring properties analysed in the report were inspected internally. The exception to this was the 1<sup>st</sup> floor office of 76 Tottenham Court Road which we were unable to gain access to but which has the same floor and window layout as the 2<sup>nd</sup> floor office above.

The analyses and calculations were undertaken using the templates and formulae as given in the BRE Guide.

A 3-Dimensional computer model was used to study the extent of any overshadowing as a result of the proposed office extension.

### BRE REPORT 1991 CRITERIA

The BRE Guide covers amenity requirements for sunlight and daylight to residential buildings around any development site.

Before dealing specifically with the requirements of the Guide under the various headings, we would note certain relevant aspects set out in the Introduction to the Guide which are as follows:

*"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the developer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design....These guidelines need to be applied sensibly and flexibly....Another important issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light"*

## 3. DAYLIGHTING

The requirements governing daylighting to existing residential buildings around a development site are set out in Part 2.2 of the Guide. The amount of light available to any window depends upon the amount of unobstructed sky that can be seen from the centre of the window under consideration. The amount of visible sky and consequently the amount of available skylight is assessed by calculating the Vertical Sky Component (VSC) at the centre of

the window. The Guide advises that bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. With regard to the planning application, the rooms at the rear of 3 and 5 Tottenham Street and at the rear of 76 Tottenham Court Road are a mixture of kitchens, bathrooms, or offices.

The Vertical Sky Component was calculated by using the skylight indicator provided as part of the Guide.

The BRE Guide states the following:

*"If this vertical sky component is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the vertical sky component with the new development in place, is both less than 27% and less than 0.8 times its former value, then occupants of the existing building will notice the reduction in the amount of skylight."*

It is understood from this principle that a 27% Vertical Sky Component signifies adequacy, but where this value cannot be achieved a reduction of up to 20% of the existing value would not be noticeable by the occupants and would not therefore be considered material.

The Vertical Sky Component calculation only measures light reaching the outside plane of the window under consideration, so this is potential light rather than actual. Depending upon the room and window size, the room may still be adequately lit with a lesser Vertical Sky Component value than the target values referred to above.

The BRE Guide sets out various more detailed tests that assess the interior daylight conditions of rooms. These include the calculation of the Average Daylight Factors (ADF) and No-sky lines. The ADF value determines the level of interior illumination that can be compared with the British Standard, BS 8206: Part 2. This recommends a minimum of 2% for kitchens, 5% for offices. Offices which are lit electrically throughout most of the day are recommended a minimum ADF value of 2%.

The No-sky line or Daylight Distribution Value (DDV) contour shows the extent of light penetration into the room at working plane level which is set at 850mm above floor level in residential rooms, and 700mm above floor level for offices. If a substantial part of the room falls behind the no sky-line contour, the distribution of light within the room may look poor.

#### 4. SUNLIGHTING

Requirements for protection of sunlighting to existing residential buildings around a development site are set out in Part 3.2 of the BRE Guide. There is a requirement to assess windows of surrounding properties where the main windows face within 90 degrees of due south. The calculations are taken at the window reference point as recommended in British Standard BS8206: Part 2, at the centre of each window on the plane of the inside surface of the wall. The Guide further states that kitchens are less important in the context of considering sunlight, although care should still be taken not to block too much sun.

#### 5. SHADOWING

The guide states that any adjoining existing amenity space should not have its area of permanent shadow increased by more than 20%. This is assessed on March 21st, the spring equinox.



occupants currently mitigate the poor natural lighting levels by using electric lighting throughout most of the day. The analysis for both windows shows that they both retain over 80% of their VSC and DDV values, with some scores showing very little difference between the existing and proposed values.

We believe that the new extension will not have a significant affect on the daylight and sunlight amenities currently enjoyed by the occupants of the two offices.

### 3 TOTTENHAM STREET

A single tenant occupies the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> floors of this property which sits to the north-west of the site. The building is used as offices, with all three floors having the same floor layout which is open planned from the front of the building to the rear. There is a small area to the rear of each floor which although lit by windows facing the rear of Goodge Street Station, is also generously daylighted from the large windows to the front of the office space.

Analysis was taken for the Vertical Sky Component (VSC); Average Daylight Factor (ADF); and Daylight Distribution Value (DDV), for the rear windows on the 1<sup>st</sup> and 2<sup>nd</sup> floors. The results for this property are shown on drawings Appendix C and have also been tabulated in Appendix B.

There is a great difference in the results between the rooms at 1<sup>st</sup> and 2<sup>nd</sup> floor levels. This is principally due to the rear window of the 1<sup>st</sup> floor looking straight onto the 2 storey high wall of the Goodge Street Station offices, across a light-well of less than 3 metres. This results in the existing daylight and sunlight conditions being below the recommended levels in the BRE guide. In contrast, the rear window of the 2<sup>nd</sup> floor currently benefits from overlooking the clear space across the flat roof of the proposed site.

The analysis for both windows shows that they retain over 80% of their VSC and DDV. For the ADF values, the 1<sup>st</sup> floor window retains over 80% of its existing value, but the 2<sup>nd</sup> floor window only retains 72%. However, despite this reduction, the ADF value will still be 6.66 % which is in excess of the BRE Guide standard of 5% for daylight offices. It should be noted however that the spaces served by these rear windows are used for storage and tea-points.

Towards the extreme rear of the property is a window directly facing the proposed development. This is the closest window to the proposed site of any of the adjoining properties. However, this is a half-landing window to a staircase, and therefore does not require testing.

We believe that the new extension will not have a significant affect on the day light and sunlight amenities currently enjoyed by the property.

### 5 TOTTENHAM STREET

Also known as 'Maxcliff House', the building has been developed into residential flats. Although some flats have had the original internal layout reconfigured, the rooms with windows facing the site of the proposed extension are either kitchens or bathrooms. Following the recommendation of the BRE Guide, bathrooms have not been analysed. The kitchens that may potentially be affected by the new extension belong to four flats in the building- Flats No.s 1 and 2 on the 1<sup>st</sup> floor; and Flats No.s 4 and 5 on the 2<sup>nd</sup> floor.

Analysis was taken for the Vertical Sky Component (VSC); Average Daylight Factor (ADF); and Daylight Distribution Value (DDV). The results for this property are shown on drawings Appendix C and have been tabulated in Appendix B. There is a varied amount of change over the height of the building, as the windows to the lower floors suffer from their daylight and sunlight amenities being reduced by the 2-storey wall of the existing offices of Goodge Street Station.

**FLATS NO.S 1 AND 2 ON THE 1<sup>ST</sup> FLOOR** - the analysis for both the kitchen windows shows that they retain over 80% of their VSC. For the kitchen of Flat No. 1 there is no noticeable loss in the DDV, however, the new value for the kitchen of Flat No. 2 is slightly lower than 80% of the existing value. Both windows retain over 80% of their ADF values, however it should be noted that the kitchen of Flat No. 2 already suffers from a very poor ADF value of 0.26% as compared to the 2% recommended by the BRE Guide.

The poor DDV score and ADF value of the kitchen to Flat No. 2 is a result of it already suffering from restricted daylight and sunlight amenities. However, in practice, the tenant currently supplements the lighting conditions with electric lighting. This room is also lit on an additional elevation by a second window which is unaffected by the proposed development, and receives a relatively adequate VSC of 22%.

We believe that the new extension will not have a significant affect on the day light and sunlight amenities currently enjoyed by the occupants of Flats No.s 1 and 2.

**FLATS NO.S 4 AND 5 ON THE 2<sup>ND</sup> FLOOR** - the analysis for both the kitchen windows shows that they retain over 80% of their VSC, ADF, and DDV values. However it should be noted that the kitchen of Flat No. 5 already suffers from a very poor ADF value of 0.44% as compared to the 2% recommended by the BRE Guide. Nevertheless, this ADF value is for the smaller window that directly faces the proposed site, and does not take into account of a second larger window with an ADF value of 1.9%. This second window is on an additional elevation and is unaffected by the proposed extension, resulting in the kitchen remaining adequately lit.

We believe that the new extension will not have a significant affect on the day light and sunlight amenities currently enjoyed by the occupants of Flats No.s 4 and 5.

## 8. SHADOW ANALYSIS

A shadow analysis is required to ascertain the impact of the proposed development on any garden or open spaces. We have ascertained that there are three such potential spaces. However, two of these spaces are inaccessible flat roofs for the ground floors of 3 Tottenham Street, and 76 Tottenham Court Road. Therefore, no testing is required for these.

To the rear of 5 Tottenham Street is a yard area that is accessible via the kitchen window of Flat No. 1, and is used for storage as well as recreation by the occupants of the flat. A shadow study was conducted for this amenity space for the 21<sup>st</sup> of March, the Spring Equinox in accordance with the BRE Guide. The Guide recommends that amenity spaces that fall in shadow on this date will receive no sunlight at all during the winter months and are deemed to be in Permanent Shadow, and that any increase in Permanent Shadow should not be greater than 20% of the existing value.

Shadow plots are shown in Appendix D. A visual comparison shows that the yard does not currently experience a large amount of Permanent Shadow, although from noon onwards, it does suffer overshadowing by the portion of the property adjacent to it on the South-west. The analysis of the yard shows that on the Spring Equinox, the yard area does not receive any additional shadow as a result of the proposed extension, due to the extension being set back from the perimeter of the site. As such, there is no impact at all on the area, whether due to overshadowing or an increase in Permanent Shadow, on this amenity space from the proposed development.

## 9. CONCLUSION

Undoubtedly, the proposed development will have an effect on the daylight and sunlight conditions of all the neighbouring properties to the site.

As can be seen from the results, the results vary quite widely over the surrounding area, with a great difference in the results between the rooms at 1<sup>st</sup> and 2<sup>nd</sup> floor levels, and between windows that look straight onto the existing 2-storey wall of the Station offices, and those with a clear view over the existing site. However there is no effect on shadowing for outdoor amenity spaces.

Although the existing tight urban surroundings have created conditions where the Vertical Sky Component for all the tested windows are below that as recommended by the BRE Guide, the results of the tests show that with the proposed development in place, any reduction in the Vertical Sky Component will not be noticeable. Similarly except in two instances, any reduction in the Average Daylight Factor and Daylight Distribution value will not be noticeable. Where the proposed Average Daylight Factor falls below the maximum reduction as stipulated in the Guide, this is compensated with the room experiencing almost no change in the Daylight Distribution within the room. Where there is a reduction in the proposed Daylight Distribution below the maximum reduction, the difference in value is not severe.

It is our belief that having assessed the potential effects on daylight and sunlight amenities to the adjoining properties by the proposed scheme, overall there will be no noticeable reduction in the neighbouring properties' existing light conditions and that the present function of each tested room will not be unduly affected.

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