Hawkins environmental

# Internal Daylight Assessment:

## 59 Mount Pleasant

## Golden Angel Limited

17th June 2024

## Report Details:

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| **Report Title** | Internal Daylight Assessment |
| **Site** | 59 Mount Pleasant |
| **Client** | Golden Angel Limited |
| **Report No.** | H4145– DS – v1 |

## Version History:

| Version | Date | Notes | Author | Checked |
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| V1 | 17th June 2024 | Original Issue | Fiona Elsley BSc | Nick Hawkins MSc MIEnvSc |
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*This report has been prepared by Hawkins Environmental Limited for the sole purpose of assisting in gaining planning consent for the proposed development described in the introduction of this report.*

*This report has been prepared by Hawkins Environmental Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.*

*This assessment takes into account the prevailing conditions at the time of the report and assesses the impact of the development (if applicable) using data provided to Hawkins Environmental Limited by third parties. The report is designed to assist the developer in refining the designs for the proposed development and to demonstrate to agents of the Local Planning Authority that the proposed development is suited to its location. This should be viewed as a risk assessment and does not infer any guarantee that the site will remain suitable in future, nor that there will not be any complaints either from users of the development or from impacts emanating from the development site itself.*

*This report is for the exclusive use by the client named in the report. Hawkins Environmental Limited does not accept any liability in negligence for any matters arising outside of the agreed scope of works.*

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# 1. INTRODUCTION

## 1.1. Overview

Hawkins Environmental Limited has been instructed by Golden Angel Limited to undertake an internal daylight, assessment for the proposed redevelopment of 59 Mount Pleasant, situated in Holborn in the London borough of Camden.

As a consequence, a daylight/sunlight assessment has been carried out in accordance with The Building Research Establishment (BRE) report, *"Site layout planning for daylight and sunlight – A guide to good practice"* by PJ Littlefair, S King, G Howlett, C Ticleanu and A Longfield (Third Edition – 2022). This report summarises an assessment of the levels of daylight within the proposed dwellings to determine whether these rooms meet the best practice guidance on levels of internal daylight. A glossary of terms in relation to daylight and sunlight can be found in **Appendix 1**.

This report should be read in conjunction with the "*H4145 – 59 Mount Pleasant - Daylight Assessment Drawings - v1"* which contained the drawings referred to in this report.

## 1.2. Site Description

The proposed development site is situated on Mount Pleasant within Holburn in the London Borough of Camden to the north of Chancery Lane.

A location plan of the proposed site can be seen in **Figure 1.1**.

**Figure 1.1: Site Location Plan**


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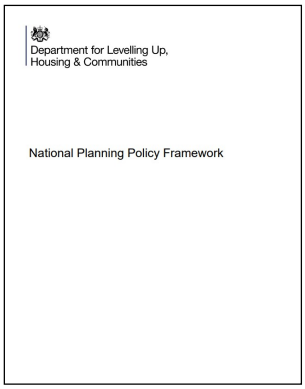
Plotted Scale - 1:1250. Paper Size – A4

# 2. NATIONAL & LOCAL PLANNING POLICY

## 2.1. National Planning Policy Framework (2023)


Department for Levelling Up, Housing & Communities

National Planning Policy Framework

The National Planning Policy Framework (NPPF) was first published on the 27th March 2012 and revised July 2018, February 2019, July 2021 and September 2023, with the latest version published in December 2023 in response to the Levelling-up and Regeneration Bill.

The NPPF outlines the Government's planning policies for England and determines how they should be applied. It provides a framework within which Local Planning Authorities are required to prepare their own locally-prepared plans, where both the policies within the NPPF and the local plan are material planning considerations against which planning decisions are determined. These distinctive local and neighbourhood plans should be interpreted and applied in order to meet the needs and priorities of their communities.

The NPPF notes *"The purpose of the planning system is to contribute to the achievement of sustainable development, including the provision of homes, commercial development, and supporting infrastructure in a sustainable manner"* (Paragraph 7). The NPPF notes sustainable development should be delivered with three main dimensions: economic; social and environmental (Paragraph 8).

The NPPF supports a presumption in favour of development, unless the adverse impacts of that development outweighs the benefits it notes "*that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development*" (Paragraph 10).

The NPPF states that in the planning system *"Planning policies and decisions should contribute to and enhance the natural and local environment by… e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"* (Paragraph 180).

Since the publication of the revised 2018 version of the NPPF (which has been retained in the 2019, 2021 and both 2023 versions), the NPPF talks specifically about daylight. Paragraph 129 states that:

*"Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities, and ensure that developments make optimal use of the potential of each site. In these circumstances… local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)".*

## 2.2. Planning Practice Guidance


The Planning Practice Guidance (PPG) was launched on 6th March 2014 and provides additional guidance and interpretation to the Government's strategic policies, outlined within the NPPF, in a web-based resource. This is updated regularly.

The PPG discusses the importance of good design and references daylight and sunlight on a number of occasions, specifically the need to ensure that daylight and sunlight patterns are considered when considering the form and scale of a new building, especially in relation to tall buildings.

In the guidance note "*Effective use of land*", last updated in 2019, guidance is provided on making effective use of land, including planning for higher density development.

The guidance states that *"a range of considerations should be taken into account in establishing appropriate densities on a site or in a particular area. Tools that can assist with this include… characterisation studies and design strategies, dealing with issues such as urban form, historic character, building typologies, prevailing sunlight and daylight levels, green infrastructure and amenity space; (Paragraph: 004 Reference ID: 66-004-20190722)".*

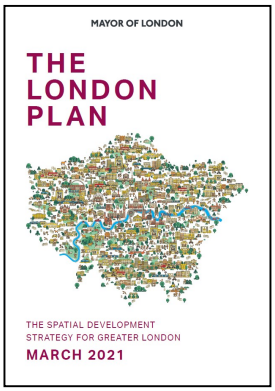
The guidance notes that daylight is a consideration: *"Where a planning application is submitted, local planning authorities will need to consider whether the proposed development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers, as well as assessing whether daylight and sunlight within the development itself will provide satisfactory living conditions for future occupants (Paragraph: 006 Reference ID: 66-006-20190722)".*

It goes on to note that *"all developments should maintain acceptable living standards. What this means in practice, in relation to assessing appropriate levels of sunlight and daylight, will depend to some extent on the context for the development as well as its detailed design. For example in areas of high-density historic buildings, or city centre locations where tall modern buildings predominate, lower daylight and daylight and sunlight levels at some windows may be unavoidable if new developments are to be in keeping with the general form of their surroundings.*

*In such situations good design (such as giving careful consideration to a building's massing and layout of habitable rooms) will be necessary to help make the best use of the site and maintain acceptable living standards (Paragraph: 007 Reference ID: 66-007-20190722)".*

Therefore, whilst it is important to ensure that levels of internal daylight within dwellings are maximised, the numerical guidelines are flexible and may vary depending on the context of the site.

## 2.3. The London Plan (2021)




The New London Plan was formally published on the 2nd of March 2021 and replaces the previous London Plan.

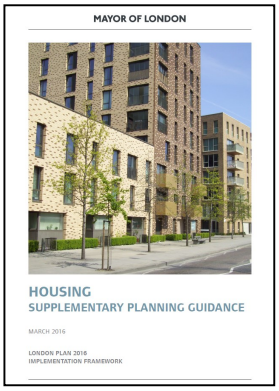
The New London Plan, provides substantial revisions in relation to daylighting. Policy D6 - Housing quality and standards states:

*"D. The design of development should provide sufficient daylight and sunlight to new and surrounding housing that is appropriate for its context, whilst avoiding overheating, minimising overshadowing and maximising the usability of outside amenity space".*

Policy D9 - Tall buildings states in relation to the environmental impact of tall structures that:

*"Wind, daylight, sunlight penetration and temperature conditions 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".*

## 2.4. Housing Supplementary Planning Guidance (2016)




Published in March 2016, the Housing Supplementary Planning Guidance highlights the elements of the London Plan that are relevant to housing development, and where applicable, provides more detail.

One important aspect of the Housing SPG is that it acknowledges that the BRE Guidelines should be applied flexibly. The SPG states:

*"Policy 7.6Bd requires new development to avoid causing 'unacceptable harm' to the amenity of surrounding land and buildings, particularly in relation to privacy and overshadowing and where tall buildings are proposed. An appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves. Guidelines should be applied sensitively to higher density development, especially in opportunity areas, town centres, large sites and accessible locations, where BRE advice suggests considering the use of alternative targets. This should take into account local circumstances; the need to optimise housing capacity; and scope for the character and form of an area to change over time.*

*The degree of harm on adjacent properties and the daylight targets within a proposed scheme should be assessed drawing on broadly comparable residential typologies within the area and of a similar nature across London. Decision makers should recognise that fully optimising housing potential on large sites may necessitate standards which depart from those presently experienced but which still achieve satisfactory levels of residential amenity and avoid unacceptable harm".*

The accompanying notes to Standard 32 reinforce this view and state that:

*"BRE guidelines on assessing daylight and sunlight should be applied sensitively to higher density development in London, particularly in central and urban settings, recognising the London Plan's strategic approach to*

*optimise housing output (Policy 3.4) and the need to accommodate additional housing supply in locations with good accessibility suitable for higher density development (Policy 3.3). Quantitative standards on daylight and sunlight should not be applied rigidly, without carefully considering the location and context and standards experienced in broadly comparable housing typologies in London".*

Standard 32 talks directly about the need for direct sunlight. The standard states:

*"All homes should provide for direct sunlight to enter at least one habitable room for part of the day. Living areas and kitchen dining spaces should preferably receive direct sunlight".*

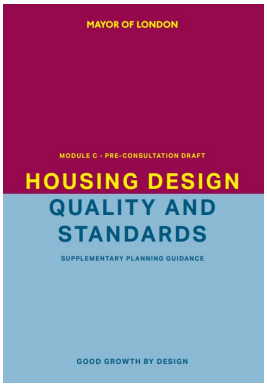
The accompanying notes go on to state that:

*"Daylight enhances residents' enjoyment of an interior and reduces the energy needed to provide light for everyday activities, while controlled sunlight can help to meet part of the winter heating requirement. Sunlight is particularly desirable in living areas and kitchen dining spaces… (The) BRE good practice guidelines and methodology can be used to assess the levels of daylight and sunlight achieved within new developments…"*

The guidance goes on to state that where Standard 32 cannot be achieved when it is not possible to provide direct sunlight to at least one habitable room:

*"… developers should demonstrate how the daylight standards proposed within a scheme and individual units will achieve good amenity for residents. They should also demonstrate how the design has sought to optimise the amount of daylight and amenity available to residents, for example, through the design, colour and landscaping of surrounding buildings and spaces within a development".*

## 2.5. Housing Design Quality and Standards Supplementary Planning Guidance (2020)




Published by the Mayor of London in 2020 as a draft, the Housing Design Quality and Standards SPG was originally intended to be a fully adopted SPG. However, the guidance was never adopted and was affectively replaced by the House Design Standards LPG. Whilst therefore not official policy, the document provides significant additional guidance on the interpretation of the 2016 Housing Supplementary Planning Guidance.

The Guidance notes *"Natural light can be restricted in densely developed areas. However, an appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts within proposed new homes, as well as the impact that proposed development would have on surrounding homes and open spaces".*

Specifically in relation to the impact of a development on surrounding properties, the guidance notes that *"Guidelines should be applied sensitively to higher density development, where BRE advice suggests considering the use of alternative targets. This should take into account local circumstances, the need to optimise housing capacity, and the scope for the character and form of an area to change over time".*

*"The BRE guidelines apply nationwide, and the default numerical targets provided are purely advisory. These are based on a uniform, 25 degree development angle (vertical obstruction angle) typical of a low-rise suburban location. This corresponds to the Vertical Sky Component (VSC) target of 27 per cent cited in the guidelines. Typical development angles in a city or central urban location are considerably higher. In Central London,*

*development angles of 40 degree or 50 degree are common and can, if well planned, deliver successful schemes. A uniform development angle of 40 degree corresponds to a VSC target of 18 per cent, and 50 degree gives a VSC target of 13 per cent. Such daylight levels have been accepted in many desirable central areas for well over a century…".*

*"Even with access to good levels of daylight on the outside of a building, it is possible to have low levels of daylight within a building due to design features such as small windows, recessed windows, poor placement of balconies or deep rooms. Therefore, consideration of the retained target VSC should be the principal consideration. Where this is not met in accordance with BRE guidance, it should not be less than 0.8 times its former value (which protects areas that already have low daylight levels)".*

*"Less weight should be given to the room-based measures of daylight such as 'no-sky line' or average daylight factor as these are dependent on the design of the neighbouring property. Except in exceptional circumstances, design features of neighbouring properties (which the guidance notes could include small windows, recessed windows, poor placement of balconies or deep rooms) should not hamper the development potential of a site".*

In relation to levels of daylight within a proposed development, the new guidance recognises for the first time that whilst the target ADF value for a kitchen is 2%, where the *"principal use of rooms designed as a 'living room/kitchen/dining room' is as a living room…, it would be reasonable to apply a target of 1.5 per cent".* Furthermore, the guidance acknowledges the competing requirements for daylight and usable outdoor amenity space and notes that the need for balconies *"can have significant bearing on the daylight and sunlight levels reaching nearby windows and rooms. Inevitably, any window or room under a balcony will receive much lower daylight and sunlight levels, although the adjacent balcony space will typically have excellent levels of daylight and sunlight amenity. Given this, the Mayor encourages boroughs to allow the daylight levels on the balcony to contribute to the ADF of the adjacent living space".*

## 2.6. London Plan Guidance – Housing Design Standards (2023)


Published by the Mayor of London in June 2023, the following design standard are designed to accompany the policies within the Lonon Plan (specifically D6 in relation to daylight). The standards include:

- *"C4.1 - New homes should be dual aspect unless exceptional circumstances make this impractical or undesirable; for example, when one side of the dwelling would be subjected to excessive noise or outside air pollution. Where single aspect dwellings are proposed, by exception, they should be restricted to homes with one or two bedspaces; should not face north; and must demonstrate that the units will: have adequate passive ventilation, daylight and privacy; and not overheat (particularly relevant for south or west-facing single aspect units)".*
- *"C4.2 - The location of the main living and eating spaces, and the main private outside space, should be optimised to make the most of the best views and the orientation. These spaces should receive direct sunlight (south-facing is preferable, provided that appropriate shading devices are incorporated) and enjoy reasonable privacy through the careful placement of windows, balcony design or other measures".*

- *"C4.3 - All homes should allow for direct sunlight in conjunction with solar shading. As a minimum, at least one habitable room should receive direct sunlight – preferably the living area and/or the kitchen and dining space".*
- *"C4.7 - All habitable rooms (including a kitchen/dining room) should receive natural light and have at least one openable window that provides a view out when seated".*

# 3. ASSESSMENT METHODOLOGY & GUIDANCE

## 3.1. Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice (2022)

### 3.1.1. Overview


The Building Research Establishment (BRE) report, "*Site layout planning for daylight and sunlight – A guide to good practice"* Third Edition 2022 by PJ Littlefair, S King, G Howlett, C Ticleanu and A Longfield (referred to as the BRE Guidance) is almost universally used as the official method in the UK and Ireland for determining whether a development meets good practice standards of daylight and sunlight and for determining the impact of a development on daylight and sunlight availability.

The BRE Guidance contains guidance on how to design developments, whilst minimising the impacts on existing buildings from overshadowing and reduced levels of daylight and sunlight, as well as solar dazzle from sloping buildings. In addition, the BRE Report provides advice on how to design buildings to ensure that they retain good practice levels of daylight and sunlight. As well as advice, the report contains a methodology to assess levels of daylight, sunlight and overshadowing and contains criteria to determine the potential impacts of a new development on surrounding buildings and to determine whether new developments are well lit internally. However, the report does state that the good practice guidelines are not mandatory, but should be considered as a guide to help rather than constrain the designer.

The BRE Report looks at three separate areas when considering the impacts on natural lighting:

1. **Daylight** – i.e. the impacts of diffuse daylight.
2. **Sunlight** – i.e. the impacts of only the direct sunlight; and
3. **Overshadowing** of Gardens and Open Spaces.

It is important to note that the methods contained within the BRE Guidance are not tests to determine whether a development meets the guidance, rather "*A Guide to Good Practice".* Therefore, whilst one should try to achieve the numerical guidance within the report, a transgression from the BRE Guidance does not indicate that the development is unsuitable, nor is it an indication that planning permission should be refused.

### 3.1.2. BRE Significance Criteria

The BRE Guidance indicates that if the reduction in daylight or sunlight as a consequence of the impact of a development fails to meet the guidelines, the impact *could* be considered significant.

However, the BRE Guidance makes note that the guidance represents *"Best Practice Guidance"* and transgressions from the numerical guidelines within the Guidance does *not necessarily* mean that the development's impact would be significant or unacceptable. The BRE Report states: *"The advice given (in the report) is not mandatory and guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in layout design."*

It should be noted that the numerical targets set out in the main text of the BRE Guidelines have been derived from a low-density suburban housing model of well-spaced two-storey houses, hence the VSC target of 27%, which is equivalent to an obstruction of 25°. This is why reference is made to the circumstances for setting alternative numerical targets in Appendix F of the Guidelines where the nature of an area is dense or higher rise.

Whilst the thresholds contained within the Guidance are an important indicator when determining the impact magnitude and the significance of an impact, the BRE Guidance suggests that professional judgement should be used and the assessment of the impact should rely on a range of factors.

Whilst the threshold of noticeability has a numerical threshold, the method to describe the magnitude of the impact is less rigid and relies on judgement and the consideration of various factors. Appendix H of the BRE Guidance provides guidance on how this can be described. **Table 3.1** shows the impact descriptors on individual receptors.

### 3.1.3. BRE Guidance on Internal Daylight

The BRE report contains guidance on how to design developments, whilst retaining good levels of daylight. As well as advice, the report contains a methodology to assess levels of daylight and contains criteria to determine whether a development is well daylit. However, the report does state that the guidelines are not mandatory, but should be considered a guide to help rather than constrain the designer.

The 2022 Third Edition of the BRE Guidance replaces the 2011 Second Edition which used the Average Daylight Factor (ADF) as the accepted methodology for measuring daylight availability in a room. It describes the ratio of outside illuminance over inside illuminance, expressed as a percentage. The higher the ADF the more natural light is available in the room. Rooms with an ADF of 2% give us a feeling of being daylit.

The new BRE Guidance incorporates the new methodology and design targets contained within BS EN 17037 and specifically the UK National Annex. It provides two methods for assessing internal daylight. The first method is the *"Illuminance Method"*, which considers the amount of illuminance (in Lux) across the room, taking into account Climate Based Daylight Modelling (CBDM). The second, less complicated and computation intensive method, is the *"Daylight Factor Method"*, which requires a target daylight factor to be exceeded over half of the room (for more detail of the methodology, see **Section 3.2**).

The new assessment methodology replaces the previous Average Daylight Factor (ADF) and No-Sky Line (NSL) tests from the 2011 Second Edition of the BRE Guidance. The ADF test was used to assess the average level of light across a whole room, whereas the NSL test was used to determine how evenly the daylight was distributed. The new *"Illuminance Method"* and *"Daylight Factor Method"*, instead of looking at the average daylight factor, considers the median level of daylight across a room, effectively replacing both ADF and NSL with a single test. As a consequence, it is not possible to directly convert ADF to either the *"Illuminance Method"* or *"Daylight Factor Method"*. In most instances, the new methodology is a more stringent test and a higher ADF would be required to achieve the recommendations within the Third Edition of the BRE Guidance.

**Table 3.2** provides an overview of the daylight criteria as recommended by Appendix C of the BRE Guidance, which itself is taken from the UK National Annex of BS EN 17037. A UK National Annex gives specific minimum recommendations for habitable rooms in dwellings in the United Kingdom. The BRE Guidance notes:

*"these are intended for 'hard to light' dwellings, for example in basements or with significant external obstructions or with tall trees outside, or for existing buildings being refurbished or converted into dwellings. The National Annex therefore provides the UK guidance on minimum daylight provision in all UK dwellings".*

**Table 3.1: BRE Report (2022) Internal Daylight Criteria**

| Room Type | Method 1: Daylight Factor Method | Method 2: Illuminance Method |
|---|---|---|
| | Target Daylight Factors $D_T$ % Note 1 Note 2 | Target Illuminance $E_T$ Lux Note 1 |
| Bedroom | 0.7 | 100 |
| Living Room | 1.1 | 150 |
| Kitchen | 1.4 | 200 |

**Note 1: For both Methods, criteria must be achieved over 50% of the working plane (0.85m above the ground)**
**Note 2: The Target Daylight Factor varies with latitude – the values present above are for Gatwick Airport, representative of southern England.**

## 3.2. BS EN 17037:2018: Daylight in buildings

The new European Standard for Daylighting, *BS EN 17037:2018: Daylight in buildings*, which was published in 2018 and adopted in 2019, proposes new Europewide standard on daylighting. The new standard recommends specifies minimum levels of daylight as follows :


- An illuminance level of at least 300 lux over at least 50 % of the space for at least half of the daylight hours in the year; and
- An illuminance level of at least 100 lux over 95 % of the space for at least half of the daylight hours in the year.

However, it has been identified that this increased requirement will be particularly problematic when designing for daylight in denser urban areas such as London and other densely populated towns and cities, where daylight availability for existing buildings is lower than the new standard proposed. Consequently, a UK specific National Annex has been added to BS EN 17037:2018, which proposes lower target values for different room types (the European wide guidance does not differentiate between room types). It should be noted that the UK specific National Annex identifies different illuminance in rooms depending on geographical latitude; therefore different criteria may apply in different parts of the country.

BS EN 17037 provides two separate methodologies for determining internal daylight and provides minimum standards for each:

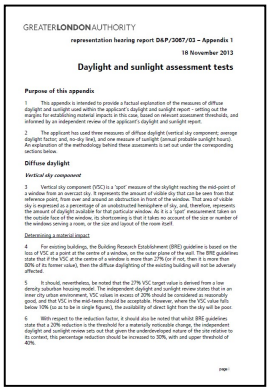
- **Method 1 – Daylight Factor Method –** this method is based on the computation of the Daylight Factor ($D_T$) at each calculation point on an assessment grid and is based on ensuring that a specific daylight factor is achieved over a specified fraction of the reference plane. The daylight factor is the illuminance at a point on the reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. The CIE standard overcast sky is used, and the ratio is usually expressed

as a percentage. Since the calculation uses an overcast sky model, the daylight factor is independent of orientation and location.

- **Method 2: The Illuminance Method** – this method is based on a target illuminance ($E_T$) from daylight to be achieved over specified fractions of the reference plane for at least half of the daylight hours in a typical year. Method 2 uses Climate Based Daylight Modelling (CBDM) which uses climatic data for the location of the site using a weather file within the daylight modelling software to calculate the illuminance from daylight at each point on an assessment grid on the reference plane for a typical year.

BS EN 17037 notes that either method can be employed to demonstrate adequate daylight. These can be used interchangeably – the standard does not require adherence to both criteria, only one of the methods.

## 3.3. Representation Hearing Report D&P/3067/03 – Daylight & Sunlight Assessment Test (2013)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representation hearing report D&P/3067/03 – Appendix 1

18 November 2013

Daylight and sunlight assessment tests

Purpose of this appendix

1 This appendix is intended to provide a factual explanation of the measures of diffuse daylight and sunlight used within the applicant's daylight and sunlight report – setting out the margins for establishing material impacts in this case, based on relevant assessment thresholds, and informed by an independent review of the applicant's daylight and sunlight report.

2 The applicant has used three measures of diffuse daylight (vertical sky component; average daylight factor; and, no-sky line), and one measure of sunlight (annual probable sunlight hours). An explanation of the methodology behind these assessments is set out under the corresponding sections below.

Diffuse daylight

*Vertical sky component*

3 Vertical sky component (VSC) is a 'spot' measure of the skylight reaching the mid-point of a window from an overcast sky. It represents the amount of visible sky that can be seen from that reference point, from over and around an obstruction in front of the window. That area of visible sky is expressed as a percentage of an unobstructed hemisphere of sky, and, therefore, represents the amount of daylight available for that particular window. As it is a 'spot' measurement taken on the outside face of the window, its shortcoming is that it takes no account of the size or number of the windows serving a room, or the size and layout of the room itself.

Determining a material impact

4 For existing buildings, the Building Research Establishment (BRE) guideline is based on the loss of VSC at a point at the centre of a window, on the outer plane of the wall. The BRE guidelines state that if the VSC at the centre of a window is more than 27% (or if not, then it is more than 80% of its former value), then the diffuse daylighting of the existing building will not be adversely affected.

5 It should, nevertheless, be noted that the 27% VSC target value is derived from a low density suburban housing model. The independent daylight and sunlight review states that in an inner city urban environment, VSC values in excess of 20% should be considered as reasonably good, and that VSC in the mid-teens should be acceptable. However, where the VSC value falls below 10% (so as to be in single figures), the availability of direct light from the sky will be poor.

6 With respect to the reduction factor, it should also be noted that whilst BRE guidelines state that a 20% reduction is the threshold for a materially noticeable change, the independent daylight and sunlight review sets out that given the underdeveloped nature of the site relative to its context, this percentage reduction should be increased to 30%, with and upper threshold of 40%.

page

The BRE Guidance notes that the VSC at the centre of a window should be at least 27%; however, this target was derived from a low density housing model. It has been often stated that this should not therefore be applied equally in all situations. In connection with the development of Holy Trinity Primary School, Dalston in 2013 (planning application 2013/0457 to the London Borough of Hackney), the Greater London Authority conducted an independent review of daylight and sunlight methodologies (Greater London Authority - Representation Hearing Report D&P/3067/03 - Daylight and Sunlight Assessment Tests).

The Hearing Report stated that *"the independent daylight and sunlight review states that in an inner city urban environment, VSC values in excess of 20% should be considered as reasonably good, and that VSC in the mid-teens should be acceptable. However, where the VSC value falls below 10% (so as to be in single figures), the availability of direct light from the sky will be poor"*.

The Hearing Report also notes that flexibility can be applied to determining to determining the impact. In underdeveloped sites, 0.7 times or more the existing VSC may be a more appropriate criterion.

# 4. INTERIOR DAYLIGHTING CALCULATIONS

## 4.1. Overview

The following section summarises an internal daylight assessment to determine whether they meet the best practice guidelines on internal daylighting.

## 4.2. Modelling

For the purposes of the assessment, a three-dimensional computer model was constructed of the proposed development. The model was constructed using Sketchup Pro 2022. At this site, Hawkins Environmental have used a variety of data sources to construct the computer model. The information used includes plans and elevations of the proposed development as provided by the client. In addition, information collected from historic publicly available planning records have been used, in connection with Ordnance Survey information (including Lidar data in relation to building heights). Wherever possible, survey information from either public records or provided by the client and their agents are utilised to add information to the model; however, where details were not present in the survey information, professional judgement has been used to estimate information where necessary.

Drawing No. **H4145_1** to **H4145_5** (found in the supporting document "*H4145 – 59 Mount Pleasant - Daylight Assessment Drawings - v1"*) summarises the daylight/sunlight model, including views of the model from multiple directions, both with and without the proposed development,

To calculate the level of daylight within the proposed dwellings, the model has been analysed using the MBS Software suite of daylight tools. MBS Software provide daylight analysis software for over 90% of daylighting consultancies in the UK. MBS Software provides a sophisticated tool for daylight analysis which uses ray-tracing techniques to produce a physically accurate representation of light distribution. It is able to take into account complex site geometry, shading surfaces, the differing reflectance of materials, as well as localised sky conditions via meteorological files for Climate Based Daylight Modelling (CBDM). The MBS Software is able to calculate the "*Illuminance Method"* in contained within BS EN 17037 and the BRE Guidance, which is often referred to as Spatial Daylight Autonomy (sDA).

For the daylight simulations, the rooms have been modelled as per the proposals, including window locations, room layouts and window sizes. The calculations were performed in accordance with the Third Edition of the BRE Guidance. The default model parameters used in the calculations can be seen in **Table 4.1**.

**Table 4.1: Parameters used in the Daylight Calculations**

| Parameter | Value |
|---|---|
| Working Plane Height | 0.85m |
| Floor Reflectance | 20% |
| Wall Reflectance | 50% |
| Ceiling Reflectance | 70% |
| Exterior Walls and Obstructions Reflectance | 20% |
| Grid Size | 0.3m |
| Glazing Transmissivity | 68% |
| Glazing Multiplier | 0.9 |
| Maintenance Factor (M) | 96% |
| Assessment Grid | 0.3m from Walls |
| Tregenza Subdivisions | 2 |
| Climate File | London Gatwick (5.15 Longitude; -0.18 Latitude) |

**Table 4.2** shows the results of the daylight modelling using the *"Illuminance Method"* contained within BS EN 17037 and the BRE Guidance, for each of the habitable rooms under consideration.

Drawing No. **H4145_6 to H4145_07** (found in the supporting document "*H4145– 59 Mount Pleasant - Daylight Assessment Drawings - v1*") shows the daylight contours for the rooms under consideration.

**Table 4.2: Results of the Daylight Modelling –Illuminance Method/ Spatial Daylight Autonomy & ADF**

| Room | Target Median Illuminance | Median Illuminance Value | Area Meeting Target Illuminance | Meets BRE 2022 & EN BS 17037? | ADF | Target ADF | Meets BRE 2011? |
|---|---|---|---|---|---|---|---|
| | $E_T$ Lux | $E_{v,d,med}$ Lux | % | | % | % | |
| Ground Floor Bedroom | 100 | 160 | 72% | YES | 1.7 | 1.0 | YES |
| Ground Floor Kitchen | 200 | 467 | 92% | YES | 3.1 | 2.0 | YES |
| Lower Ground Floor Bedroom 1 | 100 | 551 | 100% | YES | 3.7 | 1.0 | YES |
| Lower Ground Floor Living Room | 150 | 660 | 100% | YES | 6.1 | 1.5 | YES |
| Lower Ground Floor Bedroom 2 | 100 | 22 | 0% | NO | 0.6 | 1.0 | NO |

## 4.3. Results and Analysis

The results of the calculations can be seen in **Table 4.2**. The results show that of the 5 habitable rooms assessed, 4 meet the minimum recommendations of the UK National Annex of EN BS 17037 and the BRE Guidance, using the Daylight Factor Method.

It is important to note that the BRE Guidance represents *"Best Practice Guidance"* and it notes that the advice given in the report is not mandatory nor adopted planning policy and the numerical guidelines "*should be interpreted flexibly since natural lighting is only one of many factors in layout design".* Since 80% of the rooms, including all major living spaces, achieve the best practice guidance, it would generally be considered that overall the dwelling would be well lit. Whilst it would be desirable for all rooms to meet the guidance, given that the living room and kitchen (which are the rooms for which daylight is considered most important), plus two of the three bedrooms are considered well lit, the fact that one of the secondary bedrooms falls short of the BRE Guidance, this should not be a major constraint upon the development of the site.

# 5. CONCLUSIONS

A daylight/sunlight assessment has been carried out in accordance with The Building Research Establishment (BRE) report, *"Site layout planning for daylight and sunlight – A guide to good practice"* by PJ Littlefair, S King, G Howlett, C Ticleanu and A Longfield (Third Edition – 2022), which summarises the impacts of the proposed

Overall, it can be concluded that daylight and sunlight should not be a constraint upon the development of this site.

# Appendix 1
# Glossary of Lighting Terms

# Appendix 1: Glossary of Daylighting Terms

*From the BRE Guidance (2022)*

| | |
|---|---|
| **Illuminance** | A measure of the amount of light falling on a surface, usually measured in lux. |
| **Target illuminance ($E_T$)** | Illuminance from daylight that should be achieved for at least half of annual daylight hours across a specified fraction of the reference plane in a daylit space. |
| **Minimum target illuminance ($E_{TM}$)** | Illuminance from daylight that should be achieved for at least half of annual daylight hours across 95% of the reference plane in spaces with vertical and/or inclined daylight apertures. |
| **Daylight factor (D)** | Ratio of total daylight illuminance at a reference point on the working plane within a space to outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky. Thus a 1% D would mean that the indoor illuminance at that point in the space would be one hundredth the outdoor unobstructed horizontal illuminance. |
| **Target daylight factor** | Daylight factor value equivalent to the target illuminance to be exceeded for more than half of annual daylight hours over a specified fraction of the reference plane within a daylit space. |
| **Minimum target daylight factor** | Daylight factor value equivalent to the minimum target illuminance to be exceeded for more than half of annual daylight hours over 95% of the reference plane within spaces with vertical and/or inclined daylight apertures. |
| **CIE standard overcast sky** | A completely overcast sky for which the ratio of its luminance $L\gamma$ at an angle of elevation $\gamma$ above the horizontal to the luminance $Lz$ at the zenith is given by:<br>$L\gamma = Lz \frac{(1 + 2 \sin \gamma)}{3}$<br>A CIE standard overcast sky is darkest at the horizon and brightest at the zenith (vertically overhead). |
| **Daylight, natural light** | Combined skylight and sunlight. |
| **No sky line** | The outline on the working plane of the area from which no sky can be seen. |
| **Obstruction angle** | The angular altitude of the top of an obstruction above the horizontal, measured from a reference point in a vertical plane in a section perpendicular to the vertical plane. |
| **Annual probable sunlight hours** | The long-term average of the total number of hours during a year in which direct sunlight reaches the unobstructed ground (when clouds are taken into account). |
| **Sky factor** | This is used in rights to light calculations. It is the ratio of the parts of illuminance at a point on a given plane that would be received directly through unglazed openings from a sky of uniform luminance, to the illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. The sky factor does not include reflected light, either from outdoor or indoor surfaces. |
| **Vertical sky component (VSC)** | This is a measure of the amount of light reaching a window. It is the ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings. |
| **Reference plane or working plane** | Horizontal, vertical, or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 0.85 m above the floor in houses and factories, 0.7 m above the floor in offices. |
| **Assessment grid** | Grid of calculation points on the reference plane that is used to calculate daylight factor or illuminance from daylight. Also known as calculation grid. |
| **(Solar) irradiance** | A measure of the amount of solar radiation (including infrared and ultraviolet radiation as well as daylight) falling on a surface. Usually measured in Watts per square metre. |