Hawkins environmental

Internal Daylight Assessment:

11-13 New Wakefield Street, Manchester

Timber SPV Ltd

5th January 2024

Report Details:

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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.

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1. INTRODUCTION

1.1. Overview

Hawkins Environmental Limited has been instructed by Timber SPV Ltd to undertake an internal daylight assessment for the redevelopment of 11-13 New Wakefield Street, Manchester.

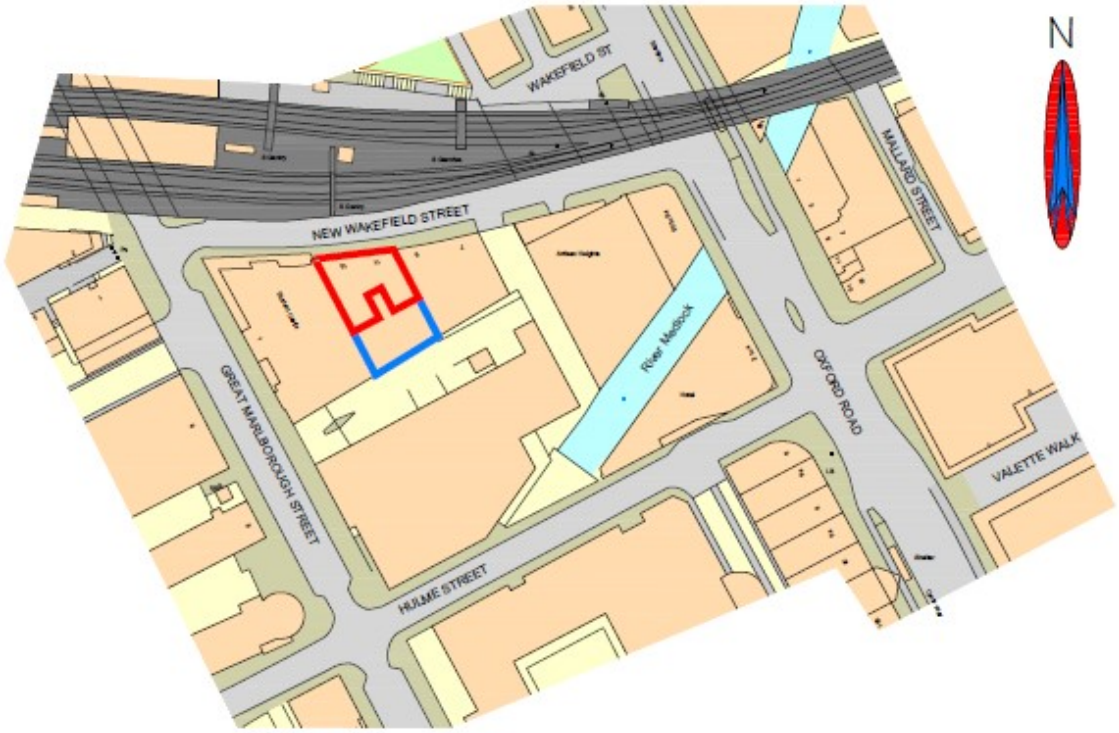
This daylight assessment has been carried out in accordance with The Building Research Establishment (BRE) report*, "Site layout planning for daylight and sunlight – A guide to good practice"* by PJ Littlefair, S King, G Howlett, C Ticleanu and A Longfield (Third Edition – 2022). This report summarises 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 "*H3986 - 11-13 New Wakefield Street, Manchester Daylight Assessment Drawings v1"* which contained the drawings referred to in this report.

1.2. Site Description

The development site is situated on New Wakefield Street, located in the south of Manchester City Centre. To the north of site is a railway viaduct, upon which Manchester Oxford Road railway station is located. The proposed development will see the conversion of the second and third floors from offices to 16 one-bedroom dwellings. The ground floor of the building is the Brickhouse Social bar and restaurant, with the Kable nightclub located within the basement. A location plan of the proposed site can be seen in **Figure 1.1**.

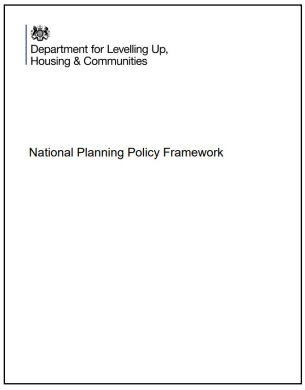
Figure 1.1: Site Location Plan



SITE LOCATION PLAN - 1:1250
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2. NATIONAL & LOCAL PLANNING POLICY

2.1. National Planning Policy Framework (2023)



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.

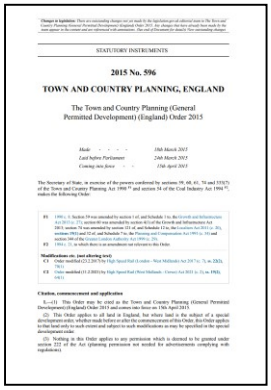
The guidance notes that daylight is a consideration: *"Where a planning application is submitted, local planning authorities will need to consider whether the proposed development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers, as well as assessing 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 Town and Country Planning (General Permitted Development) (England) Order 2015



The Town and Country Planning (General Permitted Development) (England) Order 2015, as amended by The Town and Country Planning (Permitted Development and Miscellaneous Amendments) (England) (Coronavirus) Regulations 2020, states that Class O Offices to Dwellingshouses will be permitted for:

"Development consisting of a change of use of a building and any land within its curtilage from a use falling within Class B1(a) (offices) of the Schedule to the Use Classes Order, to a use falling within Class C3 (dwellinghouses) of that Schedule" providing that the developer applies *"to the local planning authority for a determination as to whether the prior approval of the authority will be required"* in

relation to the *"the provision of adequate natural light in all habitable rooms of the dwellinghouses".*

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

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. 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."*

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) is 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 3.1 provides an overview of the daylight criteria as recommended by Appendix C of the BRE Guidance, which itself if 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.

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. **H3986_1** to **H3986_5** (found in the supporting document "*H3986 – 11-13 New Wakefield Street, Manchester - 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

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. **H3986_6** to **H3986_7** (found in the supporting document "*H3986 – 11-13 New Wakefield Street, Manchester - 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	Room Use	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	%		%	%	
Apartment 1	Lounge / Kitchen	200	541	94%	YES	4.7	2.0	YES
Apartment 1	Bedroom	100	1125	100%	YES	7.2	1.0	YES
Apartment 2	Lounge / Kitchen	200	550	73%	YES	4.3	2.0	YES
Apartment 2	Bedroom	100	764	100%	YES	5.0	1.0	YES
Apartment 3	Lounge / Kitchen	200	1137	100%	YES	7.1	2.0	YES
Apartment 3	Bedroom	100	1332	100%	YES	6.3	1.0	YES
Apartment 4	Lounge / Kitchen	200	430	79%	YES	3.6	2.0	YES
Apartment 4	Bedroom	100	1212	100%	YES	5.9	1.0	YES
Apartment 5	Lounge / Kitchen	200	566	95%	YES	4.7	2.0	YES
Apartment 5	Bedroom	100	1159	100%	YES	7.3	1.0	YES
Apartment 6	Lounge / Kitchen	200	597	75%	YES	4.3	2.0	YES

Room	Room Use	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	%		%	%	
Apartment 6	Bedroom	100	718	100%	YES	5.2	1.0	YES
Apartment 7	Lounge / Kitchen	200	1971	100%	YES	9.1	2.0	YES
Apartment 7	Bedroom	100	1250	100%	YES	6.1	1.0	YES
Apartment 8	Lounge / Kitchen	200	417	78%	YES	3.4	2.0	YES
Apartment 8	Bedroom	100	1280	100%	YES	6.2	1.0	YES

4.3. Results and Analysis

The results of the calculations can be seen in **Table 4.2**. The results show that of the 16 habitable rooms assessed, all meet the minimum recommendations of the UK National Annex of EN BS 17037 and the BRE Guidance, using the Daylight Factor Method; i.e. all rooms would be considered well lit.

5. CONCLUSIONS

An internal daylight 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.

The results show that of the 16 habitable rooms assessed, all meet the minimum recommendations of the UK National Annex of EN BS 17037 and the BRE Guidance, using the Daylight Factor Method; i.e. all rooms would be considered well lit.

Appendix 1
Glossary of Lighting Terms

Appendix 1: Glossary of Lighting Terms

From the BRE Guidance

Average daylight factor (ADF)	Ratio of total daylight flux incident on the working plane to the area of the working plane, expressed as a percentage of the outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky. Thus a 1% ADF would mean that the average indoor illuminance would be one hundredth the outdoor unobstructed illuminance.
CIE standard overcast sky	A completely overcast sky for which the ratio of its luminance Lγ at an angle of elevation γ above the horizontal to the luminance L_z at the zenith is given by: $L_\gamma = L_z \frac{(1 + 2\sin\gamma)}{3}$ 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.
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	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 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)	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.
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.