For MAK

DAYLIGHT SUNLIGHT

REPORT

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Prepared by:	Hamaid M. Khan
Email:	hamaid@ufarchitect.com
Mobile:	07869580774
Client:	
Site:	63 Nicholas Avenue (Topps Tiles), Uxbridge, UB8 3FA

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1. General Summary

1.1. Job Scope

This daylight & sunlight report has been prepared for MAK for the proposed addition of a third floor on an existing 3 storey structure at 63 Nicholas Avenue, Uxbridge, UB8 3FA. The objective of this report is to evaluate the daylight sunlight performance of the newly proposed development, and any potential impact of the surrounding buildings on the proposed development.

1.2. Daylight-Sunlight Standards

To confirm the usefulness of this study, a detailed daylight sunlight assessment is carried out following the guidelines set out in

- the 3rd edition 2022 Building Research Establishment (BRE guide BR-209-2022), titled as: **'Site Layout Planning for Daylight and Sunlight – A good practice guide'** and

- British Standard 8206 – 2: 2008 – **'Lighting for Buildings – Part 2: Code of Practice for Daylighting'**.

A brief description of the standards and guidelines employed in this assessment can be found in Appendix A.

1.3. Daylight & Sunlight Assessment Report – A Summary

The architectural plans for the proposed development conform to the daylight & sunlight criteria set forth by the BRE guidelines. Consequently, there are no valid reasons to contest the proposed development concerning the well-being of daylight and sunlight.

1.4. Approach to BRE Guidelines

BRE guidelines offer important benchmarks for construction. However, flexible approach towards BRE guidelines before carrying out computational assessment allows for adaptability, innovation, and responsiveness to changing circumstances and objectives. BRE acknowledge this flexibility, and this approach makes the project handling more practical, sustainable, and community-oriented. Section 3.3 discuss in detail the mitigating factors considered in this study.

2. Introduction

2.1. Job Scope

We have carried out a detailed daylight sunlight assessment for the proposed work at **63 Nicholas Avenue, Uxbridge, UB8 3FA**. The assessment is to evaluate the potential impact of the surrounding buildings on the "Right to Light" claim for the proposed design and vice versa.

The proposed development includes the construction of an additional 3rd floor on an existing 3-storey structure.

2.2. Site Location Plan

As notified in section 1.2, both BRE guidelines and British Standard 8206 – 2: 2008 are taken into consideration while preparing the daylight sunlight report for the proposed design.

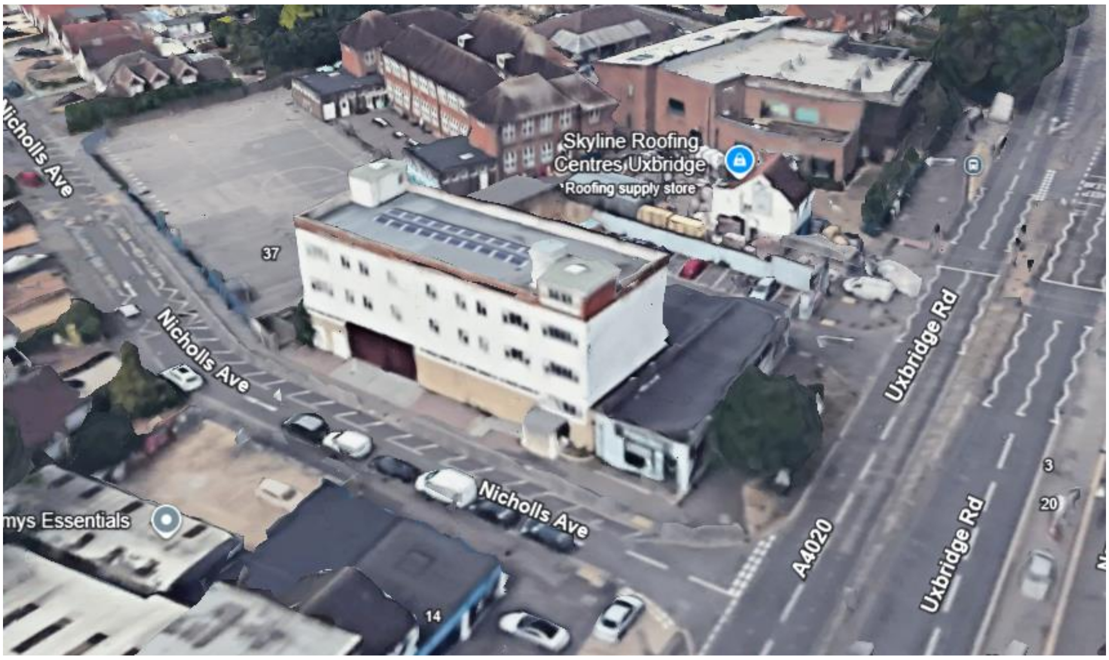


Figure 1. Google earth view of the proposed site

Figure 2. Site view of the proposed site

2.3. Report Assessment Limitations

- Report assessment of the proposed building under daylight sunlight assessment is based on the attached proposed drawings.

- A detailed topographical survey is not required for existing surrounding buildings and ground heights because of its relatively plain topology. Thus, surrounding building locations and any heights are derived through site photographs, CAD drawings, oblique aerial photography, Google Earth, and general visual assessment.

- Developmental drawings and other relevant details required for the daylight sunlight assessment are provided with this report.

3. Assessing BRE Standards & Mitigation

3.1. Daylight Standards

- BRE guidelines recommend a target Vertical Sky Component (VSC) assessment value of 27%. However, in cases where VSC values of the proposed design are lower than 27%, the BRE permits a reduction of 20% from that obtained in the existing building.

These criteria should not be regarded as rigid due to the intricate nature of urban planning. A reduction in daylight distribution exceeding 20% may indeed be noticeable to the occupants, but it's important to note that "noticeable" does not necessarily translate to "significant" or "adverse." Instead, it underscores the need for thorough consideration within the broader context of the development.

In essence, these guidelines remain flexible because urban planning is influenced by a multitude of intricate factors. A decrease in daylight beyond 20% might be perceptible to individuals, but it does not automatically imply a substantial or negative impact. To make informed decisions in urban planning, we must assess the situation comprehensively, taking all relevant factors into account.

3.2. Sunlight Standards

- BRE guidelines recommend an Annual Probable Sunlight Hours (APSH) target value of 25% for living rooms. A 5% of this sunlight should be available during the winter months. However, in cases where APSH values fall below 25%, the BRE permits a reduction of 20% from that obtained in the existing building.

- This flexibility is approached after considering mitigating factors.

3.3. Mitigating Factors

In complex design studies, especially within densely populated areas, a multitude of factors can complicate adherence to the BRE guidelines. Hence, it becomes imperative to meticulously evaluate mitigating factors as an essential phase in the development process.

It's important to consider these mitigating factors alongside the quantitative data at hand. The aim is to adopt a balanced approach that takes into account the concerns and entitlements of neighboring parties while still permitting developers to make reasonable use of the land.

Thus, BRE guidelines emphasize flexibility for designers rather than strict constraints. They are meant to be used as tools to aid in the creation of thoughtful, context-aware designs. This approach encapsulates the essence of responsible and holistic urban planning, where the needs and concerns of both the community and developers are weighed fairly to create a harmonious and sustainable built environment.

Following are some mitigating factors considered in this study;

- **Mitigating Factor #1:** A key mitigating factor arises when nearby buildings are positioned very closely to the planned site boundary. This situation can significantly obstruct light for the intended design. In such instances, it could be difficult to prevent a reduction in daylight or sunlight. Consequently, the local authority may consider applying different target values.

- **Mitigating Factor #2:** In cases where sites are either undeveloped or require infill development, it's often challenging to avoid increased obstruction and more frequent non-compliance with guidelines. For instance, if there's a gap between terraced properties or an existing street with tall buildings, it's generally acceptable in planning to fill such gaps or reinstate previous structures, even if it affects neighboring buildings.

- **Mitigating Factor #3:** The BRE guidelines also acknowledge that when buildings align with the height and proportions of existing surrounding structures, a greater level of obstruction may be inevitable, resulting in more instances of non-compliance.

- **Mitigating Factor #4:** When considering daylight and sunlight assessments, kitchens and bedrooms typically receive less importance compared to primary spaces like living rooms.

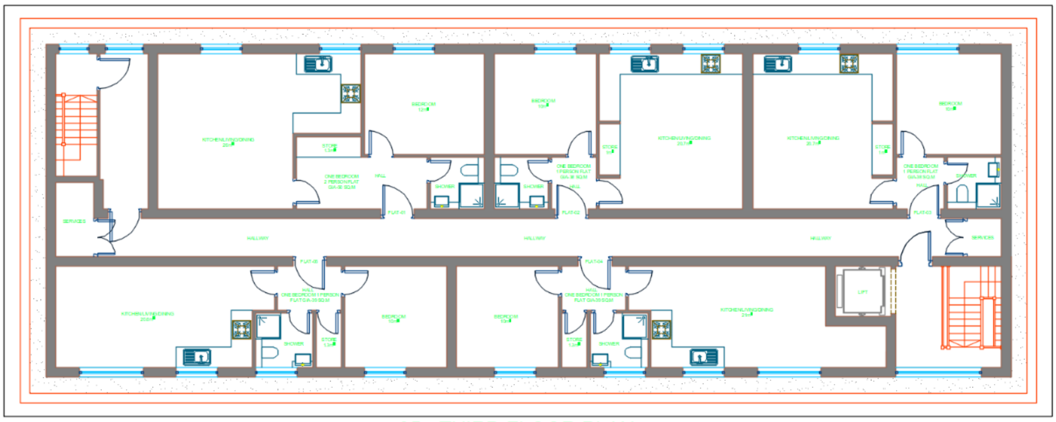
- **Mitigating Factor #5:** The orientation and architectural design of the building itself can significantly impact how daylight is distributed within the interior spaces. For example, the north facing spaces are expected to receive less direct sunlight compared to other orientations.

- **Mitigating Factor #6:** The height of the proposed building is a pivotal factor that can greatly impact the availability of daylight for the proposed design.

The preliminary assessment shows that the surrounding buildings are quite far from the proposed structure such that the effect of them on the proposed design or vice versa is expected to be negligible. However, the north-south orientation of the proposed building can create some degree of loss in its natural daylight access.

4. Building layout

The proposed development introduces a new third floor above the existing three-storey structure. This floor accommodates five additional self-contained units, arranged efficiently along a central lobby. The lobby provides direct access to two separate stairwells, ensuring safe and convenient escape routes. The layout has been designed to balance functionality, safety, and compliance with building regulations.



05 - THIRD FLOOR PLAN

Figure 3 Proposed plans and site layout on the third floor

Figure 4 Proposed elevations

5. Results and Consideration

5.1. Daylight Assessment Report

The detailed results of the daylight tests conducted for the proposed building, in compliance with the BRE recommendations, are provided in Appendix B.

5.2. Assessment Steps & Criteria

To conduct a daylight assessment for the proposed design, we carefully evaluated the nearby structures to understand their potential impact on the new development and vice versa.

5.2.1. Proposed development effects on neighboring structures and vice versa

- As observed from **Figure 1** and **Figure 2**, the site in context is not closely aligned with other neighboring structures, as there is a significant gap between any of them on any side of it. Moreover, the proposed additional third floor is unlikely going to be shaded by any structure around.

- On the contrary, the only structure closer to the proposed building is approx. 30m on the northern side. Once again, the impact of the proposed additional floor is unlikely going to shade any existing neighboring structure.

5.2.2. Building orientation impact on the proposed design

- The proposed building is exposed to direct sunlight either on the north or the southern side. The north facing is obviously devoid of direct sunlight or very little exposure during the summer. On the other hand, south facing side will receive ample direct sunlight. As a result, rooms with openings on the northern side will have limited exposure to direct sunlight throughout the day.

5.2.3. General assessments and criteria

- Our analysis revealed that buildings surrounding the proposed development are a mix of both residential and commercial in nature.

- When assessing the proposed building, our primary focus is on prioritizing the windows in the living rooms. We have compiled a comprehensive list of all the windows (or window elements) in question and have conducted a thorough evaluation. To provide a detailed assessment, we have further subdivided these windows, considering their positions on the walls, in order to gauge the net daylight impact effectively.

- As for the surrounding buildings, we've estimated their floor areas and heights through a combination of Google Maps data, images, and general on-site surveys. This topographical and building size assessment is observed to closely align with the actual values found at the site.

- Elements such as opaque glazing, soil pipes, stairwells, etc., typically indicate areas like toilets, bathrooms, or circulation spaces, which, as per the BRE guidelines, do not require assessment.

5.3. Proposed development General Site Assessment

The proposed development at 63 Nicholas Avenue, Uxbridge, UB8 3FA, is located within the London Borough of Hillingdon.

- The site lies in a well-established urban area, characterized by a mix of residential and commercial properties.

- It is within walking distance of local bus stops, which provide frequent services along nearby routes. However, the nearest train and London Underground stations—such as West Drayton (rail) and Uxbridge or Hillingdon (Tube)—are approximately 1.6 to 1.7 miles away, which generally falls outside typical walking range.

CAD drawings are attached with it for more information and detailed planning layout of the proposed structure.

5.4. Assessment of Surrounding Buildings Under Observation

The findings using the preliminary analysis indicate that the proposed development will have a minimal impact on the surrounding buildings.

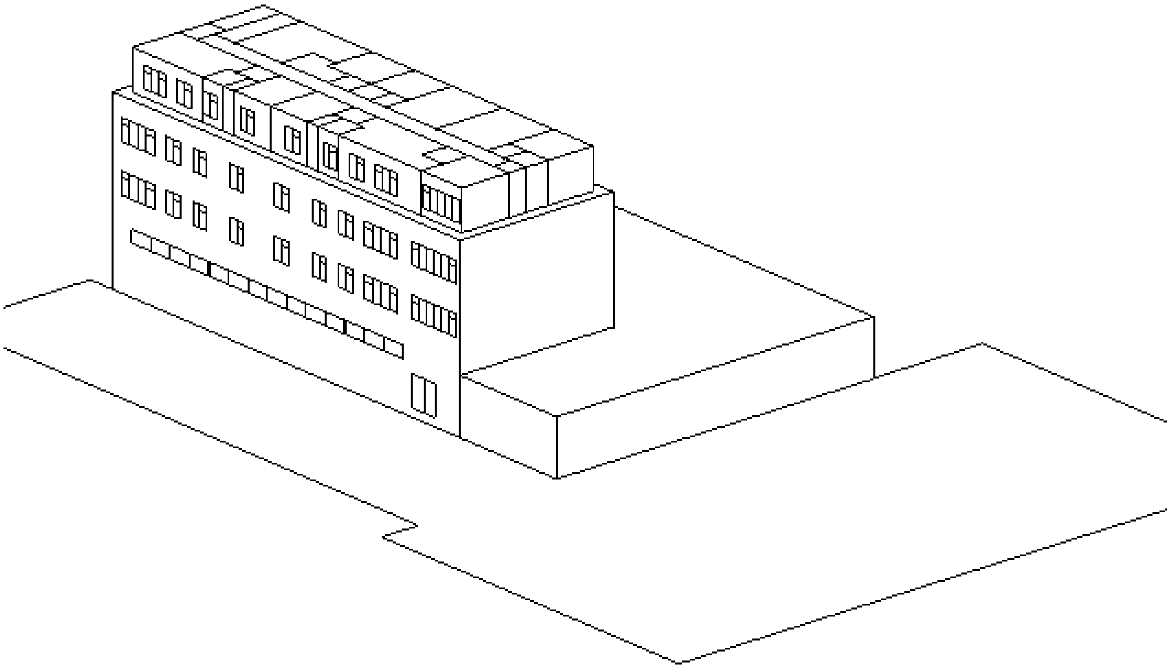


Figure 5. Building layout of the proposed model in the IESVE software. No neighboring structures are drawn.

5.5. Daylight Sunlight Summary for the Proposed Design

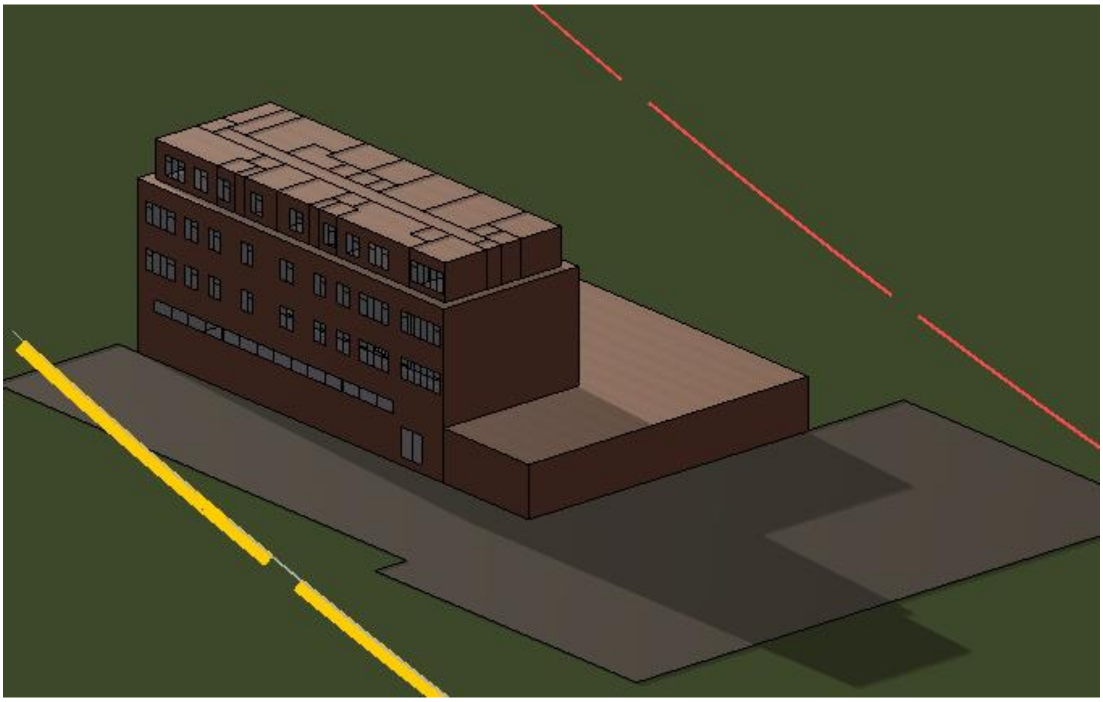


Figure 6. Window elements representation on an IESVE model.

A detail analysis of all daylight sunlight components is discussed below:

5.5.1. Vertical Sky Component (Daylight):

Almost all the window elements in the proposed development representing bedrooms and/or living/kitchen comply with the BRE guidelines, achieving at least 27% and/or 0.8 times their previous VSC values or above, as shown in **Figure 7**.

Table 1 in **Appendix B** shows the obtained results for the VSC assessment.

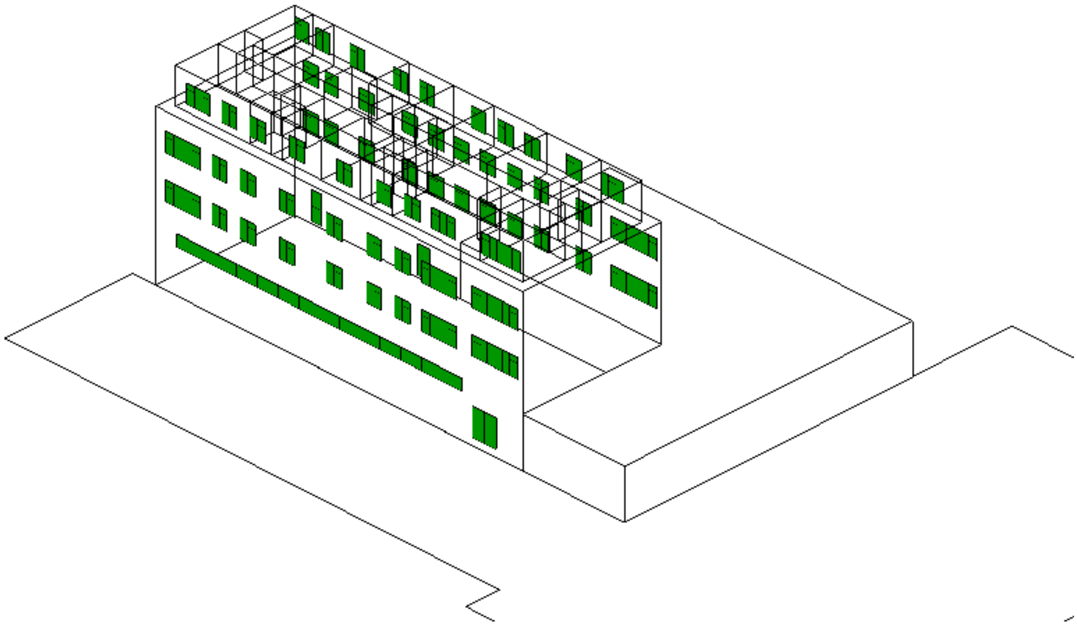


Figure 7. VSC assessment of all window elements.

5.5.2. Direct Sunlight Hours (Sunlight):

The proposed development fronts south and backs north, resulting in a natural variation in direct sunlight exposure between façades. As expected with this north–south orientation, north-facing windows receive limited direct sunlight on 21st March, while south-facing windows benefit from stronger exposure. However, due to the development's elevated position on the top floor and the generous separation distance from surrounding buildings, potential overshadowing is minimized. As a result, almost all window elements—regardless of orientation or flat—successfully achieve the minimum standard of 2 hours of direct sunlight for LKD and 1 hour for bedrooms as per by BRE guidelines. This outcome demonstrates that the scheme provides good levels of natural light for future occupiers, while also aligning with best practice criteria for daylight and sunlight performance.

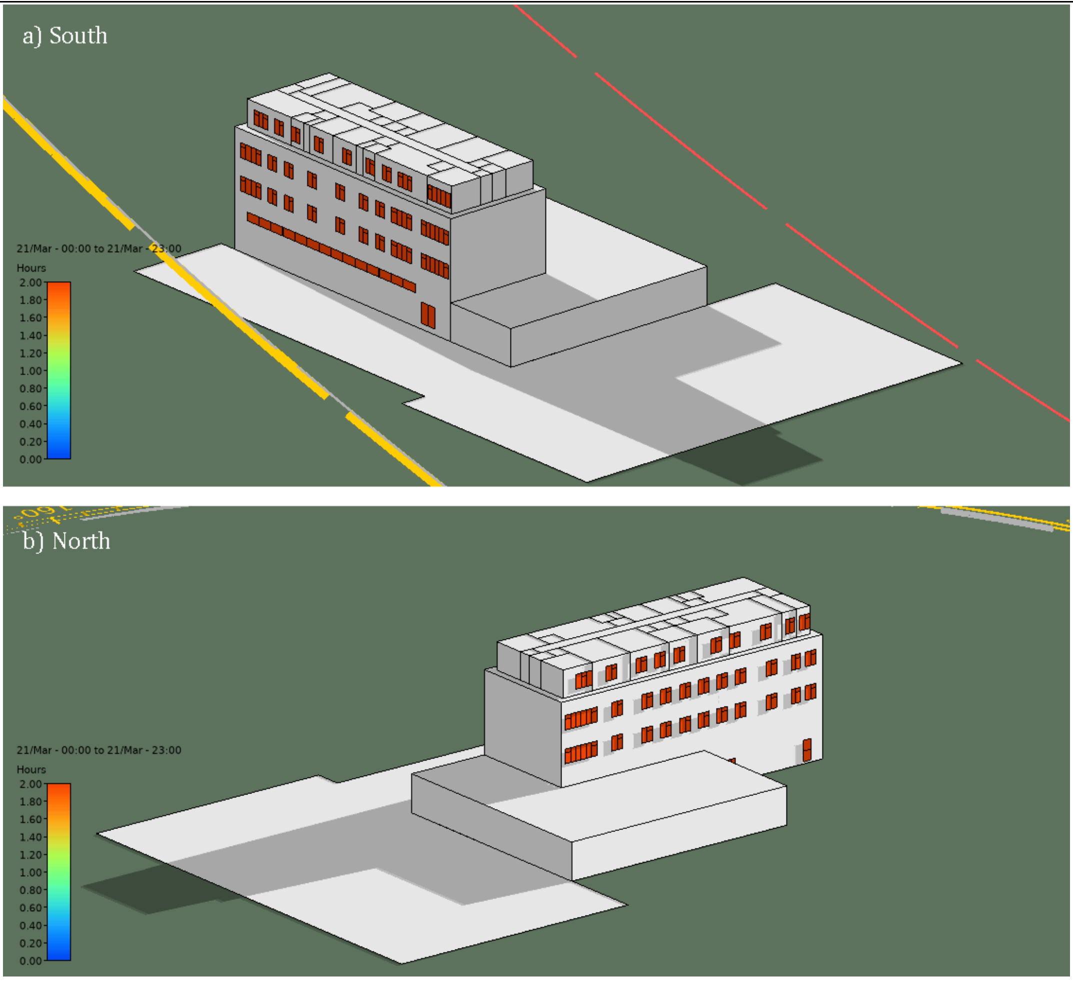


Figure 8. Direct Sunlight Hours analysis of window elements of the proposed development on 21st March as seen in (a) South and (b) North facing.

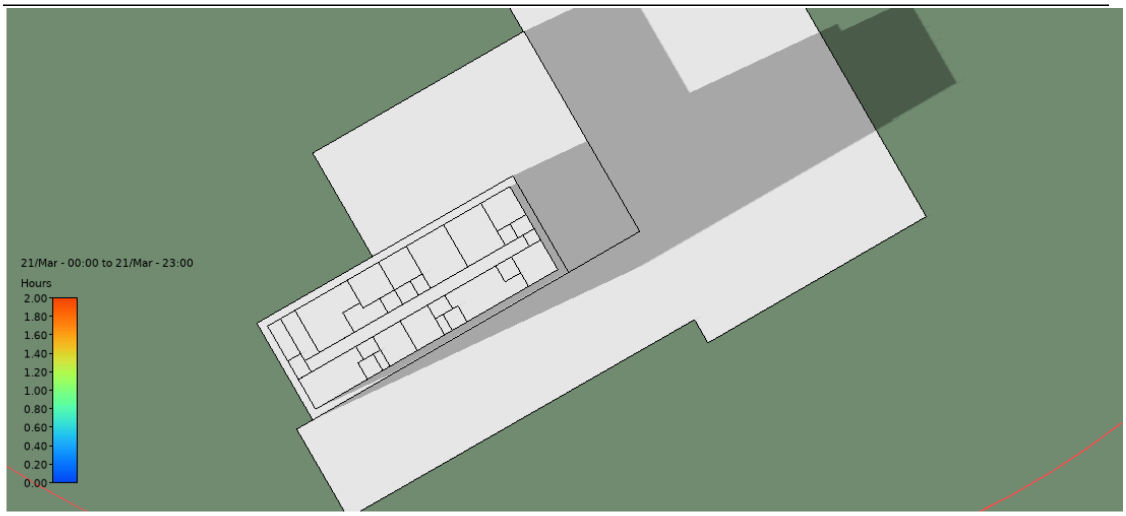


Figure 9 Top view of DSH showing limited exposure of direct sunlight on windows facing north side

5.5.3. Annual Probable Sunlight Hours (APSH) (Sunlight):

APSH is the total number of hours each year when sunlight is expected to shine on the center of each window, considering the usual cloudiness for the area.

This test is commonly employed to evaluate facades that face within 90 degrees of due south. The BRE Handbook mentions:

"…a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day".

For existing residential buildings, the BRE Handbook suggests that:

"all main living rooms of dwellings… should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun".

Time Range: Summertime – 21st March-to-21st September:

The proposed development features a combination of south- and north-facing windows, resulting in a varied range of APSH outcomes depending on orientation.

- South-facing rooms, including both LKD and bedrooms, perform well with annual APSH levels around 26–27% and winter levels around 14–15%, comfortably meeting BRE guideline targets. These results align with the BRE Handbook's recognition that façades facing within 90° of due south generally receive the highest levels of direct sunlight throughout the year.

- North-facing rooms, by contrast, achieve annual APSH of around 7% and winter APSH values of 1–1.5%. While this falls below the BRE benchmarks, this outcome is typical for windows facing away from the sun path. Importantly, these lower results are due to orientation alone, as there are no surrounding tall buildings or obstructions creating additional shading.

Overall, the summertime results highlight that south-facing rooms are well-lit and compliant, while the more limited performance of north-facing rooms reflects natural orientation effects, rather than any adverse impact from the proposed development.

Time Range: Wintertime – 21st September-to-21st March:

During winter, when the sun follows a lower trajectory from southeast to southwest, the difference between orientations becomes more pronounced.

- South-facing rooms again perform strongly, with winter APSH values around 14–15%, exceeding the BRE guideline of 5%.

- North-facing rooms record values of 0–1.5%, which are modest but consistent with the BRE Handbook's acknowledgement that north-facing façades generally receive very limited sunlight in the UK climate, particularly during the winter months.

The APSH results show that all south-facing habitable rooms comfortably meet BRE criteria, demonstrating good access to sunlight. North-facing rooms record lower values, but these are a natural consequence of orientation and are not linked to any external overshadowing.

In line with BRE guidance, this distinction is expected, as façades within 90° of due south benefit most from sunlight, while those facing north are inherently more constrained.

5.5.4. Daylight Factor (DF)

According to the BRE guidelines, the DF is defined as the ratio of the total daylight flux reaching the working plane, expressed as a percentage of the outdoor illuminance on a horizontal plane under unobstructed CIE standard overcast sky conditions. For housing, BS 8206-2 provides minimum DF values of 2% for kitchens, 1.5% for living rooms, and 1% for bedrooms.

The daylight factor results for the living and kitchen areas of the proposed house exceed the minimum requirement of 1.5% and 2%, respectively. Additionally, the DF for bedrooms for both rooms exceed the minimum of 1%. These results indicate that the selected rooms comply with the BRE guidelines for daylight factor assessment. **Table 3** in **Appendix B** shows the obtained results for the daylight factor assessment.

The daylight factor (DF) analysis highlights clear differences in daylight penetration between the bedrooms and the larger living–kitchen–dining (LKD) spaces, as well as between north- and south-facing orientations. Bedrooms, such as Flat 4 (north-facing), show relatively limited daylight penetration, with high DF values concentrated close to the window and a rapid drop-off deeper into the room. In contrast, LKD areas (e.g., Flat 1 south-facing) demonstrate much broader daylight spread, with higher average DF values sustained further into the space, owing to their larger glazing areas and more open layouts.

Orientation also plays a critical role: south-facing spaces (Flat 1) receive higher DF values and deeper daylight penetration compared to north-facing counterparts (Flat 4), where daylight remains more localized around the window. This distinction is significant for occupant comfort and energy use, as south-facing LKDs are more likely to achieve daylight autonomy and reduced reliance on artificial lighting, whereas north-facing bedrooms may require supplementary lighting for adequate illuminance in daily use.

6. Conclusion

The daylight and sunlight analysis undertaken for the proposed development at 63 Nicholas Avenue demonstrates that the scheme performs well against the criteria set out in the BRE 2022 Guidelines and BS 8206-2:2008.

VSC results confirm that all assessed windows comfortably achieve values around 39–40%, exceeding the BRE guideline threshold of 27%, thereby ensuring sufficient access to sky visibility and daylight.

DSH assessment shows that nearly all living rooms and bedrooms meet the requirement of at least two hours and one hour of direct sunlight respectively on 21st March.

APSH analysis highlights the orientation effect: south-facing rooms record annual values of

26–27% with winter levels around 14–15%, fully compliant with BRE recommendations. North-facing rooms, by contrast, record lower APSH values (around 7% annually and 1–1.5% in winter), but this is consistent with BRE guidance that north-facing façades inherently receive limited direct sunlight in the UK climate.

DF study indicates that all tested rooms surpass the minimum BRE targets (1% for bedrooms, 1.5% for living rooms, and 2% for kitchens). Living–kitchen–dining (LKD) areas, particularly those south-facing, achieve average DFs above 4%, showing good daylight penetration and reduced reliance on artificial lighting. Bedrooms also perform above minimum thresholds, with DF values ranging between 3.3–4.4%. The contrast between south- and north-facing spaces is evident, with south-facing rooms achieving higher daylight penetration and sunlight hours, while north-facing rooms rely more heavily on diffuse skylight.

Overall, the results confirm that the proposed development will provide adequate daylight and sunlight for future occupants while safeguarding the amenity of surrounding buildings. Variations between north- and south-facing façades are consistent with natural orientation effects and do not represent adverse impacts. Therefore, the proposed scheme is considered compliant with BRE daylight and sunlight standards and will offer a well-lit and comfortable internal environment.

Appendix A

The 3rd edition 2022 Building Research Establishment (BRE) Report BR-209-2022 titled "**Site Layout Planning for Daylight and Sunlight – a good practice guide**", commonly referred to as the BRE Guidelines, serves as a fundamental resource for building designers and urban planners. These guidelines offer comprehensive advice and recommendations for achieving optimal daylight and sunlight conditions in the context of site layout planning. Here are some key points to expand upon the significance and scope of these guidelines:

- The BRE Guidelines prioritize the well-being and amenity of residents, not only for the proposed development but also for people in open spaces and surrounding buildings.

- BRE Guidelines opts for an optimal balance between new developments and the existing environment. This makes the BRE guidelines an essential part of the legal and planning framework for construction projects in many jurisdictions.

- BRE Guidelines provide methodologies for conducting daylight and sunlight assessments. These assessments involve calculations and simulations to evaluate how proposed buildings will affect natural light levels, both within and outside the development site.

- Maximizing natural light reduces the need for artificial lighting and heating, contributing to energy efficiency and reducing environmental impact.

Within the BRE Guidelines, a set of evaluations and numerical criteria have been formulated to assess proposed developments to determine if they conform to the required standards for ensuring adequate levels of daylight and sunlight comfort. Here are some of the key details provided:

- **Daylight:** This centers on examining the presence and dispersion of natural sunlight within and in the vicinity of the proposed design. Elements such as the daylight factor (which measures the intensity of natural light) and the annual sunlight exposure are employed for daylight assessment.

- **Sunlight:** This concerns on how sunlight reaches various areas within and around a development. These evaluations consider aspects such as the duration of direct sunlight exposure, shading caused by nearby structures, and the potential effects on outdoor areas.

- **3D Computer Modeling:** The BRE Guidelines often recommend the use of 3D computer modeling and simulation software to visualize and analyze the impact of proposed buildings on daylight and sunlight conditions.

- **Mitigation Measures:** In cases where a proposed development falls short of the recommended daylight and sunlight levels, the BRE Guidelines also offer guidance on potential mitigation measures, such as adjusting building orientation or redesigning building elements.

In suburban development sites with lower population density, the BRE Guidelines are typically more suitable, allowing for more flexibility in site layout planning. Conversely, in densely populated urban areas, development sites often face more constraints, often due to neighboring buildings and other factors. Therefore, in dense urban environments, the guidelines should be applied with a degree of adaptability. The BRE Guidelines explicitly acknowledge this aspect in their guide book.

a) Daylight Assessment

The guidelines for evaluating daylight conditions in nearby existing buildings can be found in the pages 4 to 8 of the BRE Guidelines.

Typically, assessments for daylight should focus on habitable rooms within residential structures and the primary rooms within non-residential buildings like schools, hospitals, and offices, where occupants reasonably anticipate sufficient daylight. The primary methods employed to evaluate daylight for surrounding existing buildings are detailed below, along with an additional daylight assessment typically utilized when planning new residential structures.

The 25° section line test serves as a straightforward rule of thumb for assessing whether an existing building can continue to receive sufficient daylight in the presence of a proposed development. It helps quickly gauge if the new construction might negatively impact the daylight conditions of the surrounding structures or vice versa.

This assessment method is most effective in low-density suburban settings, where new developments are spaced apart, relatively short in height, and follow a uniform pattern. In contrast, it may not be suitable for densely populated urban areas, where tall, closely spaced buildings already block more than 25 degrees of the view from existing windows. In such urban scenarios, it's often necessary to conduct more detailed assessments from the beginning because the 25-degree assessment doesn't apply as effectively.

b) The Vertical Sky Component (VSC) Assessment

The Vertical Sky Component (VSC) assessment measures how much natural daylight directly enters a specific window. To evaluate this, the central point of the window, aligned with the outer wall, serves as the reference point. The VSC assessment is crucial for understanding the direct daylight a window can capture. It provides valuable information for optimizing natural lighting within a building, aiding in energy efficiency and occupants' well-being. Although the VSC test is helpful in predicting how a nearby development might affect things, it only looks at the light on one spot. This means it doesn't take into account the window's size or other windows that also brighten up the same room.

A VSC, or Visible Sky Coverage, is represented as a percentage. It signifies the proportion of illuminance received from a Standard Overcast Sky (CIE Sky) on a vertical surface (like a window) in comparison to the illuminance received on a horizontal surface under an unobstructed hemisphere of the same Standard Overcast Sky. In simpler terms, the Visible Sky Coverage (VSC) can be understood as the percentage of direct sky visibility that a window gets, regardless of any obstructions, compared to the direct sky exposure that an unobstructed horizontal roof-light would receive.

The highest amount of direct skylight that a vertical window can receive from a Standard Overcast Sky is 39.62%, which is commonly rounded up to 40%. According to the BRE (Building Research Establishment), when a VSC value of 27% is attained, it signifies that an adequate amount of skylight or direct daylight can reach the window of an existing building. This value is roughly comparable to a uniform obstruction of 25 degrees, as mentioned in the previous assessment.

In general, for new developments in low-density areas, it is advisable for the VSC component to exceed 27%, assuming no mitigating factors are applicable. This ensures that an adequate amount of direct daylight can reach the windows of the new building. However, when such a site is situated in a densely populated area and the VSC assessment of the existing structure on the site was already below 27%, the BRE guidelines specify that the new development on the existing site should only cause a maximum reduction of 20% in VSC. This limitation is in place to ensure that the change in VSC is not significant enough to be noticeable or disruptive to the occupants of the building.

In summary, while the 27% guideline is a general target, it can be adjusted based on the specific context of the development site, especially in densely populated areas, to minimize the impact on existing structures and their occupants.

c) Direct Sunlight Hours

BS EN 17037 is a European standard that provides guidelines for daylight in buildings. Published in 2018, titled as "Daylight in Buildings", this standard aims to establish requirements and recommendations for daylight in buildings. It also ensures the well-being and visual comfort of occupants while promoting energy efficiency.

- Daylight Availability: Amount of daylight available in different spaces within a building.

- Daylight Distribution: This provides guidelines on the distribution of daylight within a building.

The BRE guidance provides recommendations for preserving sunlight in outdoor spaces, both existing and planned. This advice applies to areas like back gardens, parks, playing fields, playgrounds, waterways, and public spaces. However, it excludes the need for assessment in the case of small front gardens and parking areas.

The permanent overshadowing assessment is carried out on March 21st, the spring equinox. This assessment identifies parts of an amenity area where no sunlight will be present during the winter months. However, it's important to note that these areas might still receive some sunlight during the summer.

As per BRE guidelines, a garden or amenity area remains well-lit throughout the year. It is thus advisable for at least half of that area to get a minimum of 2 hours of sunlight on March 21st. If, due to new development, an existing garden or amenity area doesn't meet these criteria, and the portion receiving 2 hours of sunlight on March 21st is less than 80% of what it used to be (a 20% reduction), then people are likely to notice the loss of sunlight in that area.

So, if an open outdoor space, whether existing or proposed, is shaded for over 2 hours, accounting for more than 50% of its area, and this shading is increased by over 20% due to new development, then people are likely to notice the reduction in sunlight.

d) Annual Probable Sunlight Hours (APSH) Assessment

Natural sunlight holds significant value in both residential and commercial structures. It is not only prized for its capacity to provide warmth and create a cheerful ambiance within a room but also for its potential to bestow therapeutic benefits upon occupants, fostering a sense of well-being.

In residential properties, the foremost consideration for sunlight centers on the living room and conservatories. It becomes imperative to evaluate these spaces, particularly when they feature a primary window facing within a 90-degree angle of due south. Conversely, while the significance of sunlight in areas like kitchens and bedrooms is somewhat reduced, it remains imperative to exercise caution and avoid excessive obstruction.

Within commercial or non-residential buildings, the necessity for sunlight varies according to the building's intended use. In accordance with recommendations from the Building Research Establishment (BRE), any space within a commercial establishment possessing a specific or distinctive demand for sunlight should be subjected to comprehensive evaluation.

The assessment of APSH (Annual Probable Sunlight Hours) is conducted for the primary window openings of both residential and commercial structures, specifically when these windows are oriented within a 90-degree range of true south. "Probable Sunlight Hours" can be described as the cumulative count of hours throughout the year during which sunlight is anticipated to illuminate unobstructed ground surfaces, accounting for typical cloud cover conditions.

BRE guidelines state that if a living room in an existing house has a main window facing mostly south, and if a new building nearby casts a shadow that's more than 25 degrees below the window, it can reduce the sunlight coming into the living room. This happens if, over a year, the window's center gets less than one-fourth (25%) of the yearly sunlight hours, including at least 5% between September and March. Moreover, if sunlight hours during those months drop below 80% of what they were before, then the residents of the new development can feel the change.

As a result of a new development, the amount of sunlight reaching an existing building may decrease by up to 20% during either the whole year or the winter months before people start to notice the difference.

e) Daylight Factor (DF)

The Daylight Factor (DF) is a metric used in architecture and building design to evaluate the amount of natural daylight that penetrates into the interior of a building. It is typically expressed as a percentage and represents the ratio of the illuminance (light level) inside a space to the illuminance outside the building on an overcast day.

The DF provides a way to assess the quality of daylighting in a building. A higher DF percentage indicates better natural daylighting conditions, which can lead to reduced reliance on artificial lighting during the day, energy savings, and improved occupant comfort and well-being.

Appendix B

Table 1. VSC assessment report of all window element on the proposed design. LKD – Living/Kitchen/Dining

Room ID	Room Name	VSC	Result	Room ID	Room Name	VSC	Result
TF000004	Bedrooms	39.57	Pass	TF000012	LKD	39.58	Pass
TF000004	Bedrooms	39.57	Pass	TF000012	LKD	39.82	Pass
TF000004	Bedrooms	39.75	Pass	TF000012	LKD	39.73	Pass
TF000007	Bedrooms	39.79	Pass	TF000014	Bedrooms	39.72	Pass
TF000007	Bedrooms	39.72	Pass	TF000014	Bedrooms	39.9	Pass
TF000007	Bedrooms	39.73	Pass	TF000014	Bedrooms	39.77	Pass
TF00000C	LKD	39.74	Pass	TF000016	Bedrooms	39.88	Pass
TF00000C	LKD	39.66	Pass	TF000016	Bedrooms	39.79	Pass
TF00000C	LKD	39.68	Pass	TF000016	Bedrooms	39.83	Pass
TF00000C	LKD	39.74	Pass	TF000018	LKD	39.78	Pass
TF00000C	LKD	39.72	Pass	TF000018	LKD	39.89	Pass
TF00000C	LKD	39.81	Pass	TF000018	LKD	39.76	Pass
TF00000D	LKD	39.65	Pass	TF000018	LKD	39.89	Pass
TF00000D	LKD	39.58	Pass	TF000018	LKD	39.78	Pass
TF00000D	LKD	39.59	Pass	TF000018	LKD	39.76	Pass
TF000005	Bedrooms	39.64	Pass	TF000018	LKD	39.77	Pass
TF000005	Bedrooms	39.62	Pass	TF000018	LKD	39.76	Pass
TF000005	Bedrooms	39.7	Pass	TF000006	LKD	39.73	Pass
TF000005	Bedrooms	39.64	Pass	TF000006	LKD	39.73	Pass
TF000012	LKD	39.73	Pass	TF000006	LKD	39.83	Pass
TF000012	LKD	39.71	Pass	TF000006	LKD	39.01	Pass
TF000012	LKD	39.68	Pass	TF000006	LKD	38.36	Pass
TF000012	LKD	39.28	Pass	TF000006	LKD	39.32	Pass
TF000012	LKD	39.51	Pass				

Table 2. APSH results of all window elements of the proposed structure. LKD – Living/Kitchen/Dining

Room ID	Room Name	Orientation	Annual	Annual Result	Winter	Winter Result
TF000004	Bedrooms	330	7.64	Major	1.39	Major
TF000004	Bedrooms	330	7.64	Major	1.39	Major
TF000004	Bedrooms	330	7.64	Major	1.39	Major
TF000007	Bedrooms	330	7.64	Major	1.39	Major
TF000007	Bedrooms	330	7.64	Major	1.39	Major
TF000007	Bedrooms	330	7.64	Major	1.39	Major
TF00000C	LKD	330	7.64	Major	1.39	Major
TF00000C	LKD	330	7.64	Major	1.39	Major
TF00000C	LKD	330	7.64	Major	1.39	Major
TF00000C	LKD	330	7.64	Major	1.39	Major
TF00000C	LKD	330	7.64	Major	1.39	Major
TF00000C	LKD	330	7.64	Major	1.39	Major
TF00000D	LKD	330	7.64	Major	1.39	Major
TF00000D	LKD	330	7.64	Major	1.39	Major

TF00000D	LKD	330	7.64	Major	1.39	Major
TF000005	Bedrooms	330	7.64	Major	1.39	Major
TF000005	Bedrooms	330	7.64	Major	1.39	Major
TF000005	Bedrooms	330	7.64	Major	1.39	Major
TF000005	Bedrooms	330	7.64	Major	1.39	Major
TF000012	LKD	150	27.08	Meet	14.58	Meet
TF000012	LKD	150	27.08	Meet	14.58	Meet
TF000012	LKD	150	27.08	Meet	14.58	Meet
TF000012	LKD	150	26.39	Meet	14.58	Meet
TF000012	LKD	150	26.44	Meet	14.58	Meet
TF000012	LKD	150	27.08	Meet	14.58	Meet
TF000012	LKD	150	27.08	Meet	14.58	Meet
TF000012	LKD	150	26.74	Meet	14.58	Meet
TF000014	Bedrooms	150	27.08	Meet	14.58	Meet
TF000014	Bedrooms	150	27.08	Meet	14.58	Meet
TF000014	Bedrooms	150	27.08	Meet	14.58	Meet
TF000016	Bedrooms	150	27.08	Meet	14.58	Meet
TF000016	Bedrooms	150	27.08	Meet	14.58	Meet
TF000016	Bedrooms	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000018	LKD	150	27.08	Meet	14.58	Meet
TF000006	LKD	330	7.46	Major	1.21	Major
TF000006	LKD	330	7.27	Major	1.02	Major
TF000006	LKD	330	7.64	Major	1.39	Major
TF000006	LKD	330	6.24	Major	0	Major
TF000006	LKD	330	4.85	Major	0	Major
TF000006	LKD	330	6.05	Major	0	Major

Table 3. Daylight Factor for Rooms under observation at all levels in the proposed design. Grid Size - 0.2m, Margin - 0.1m. LKD – Living/Kitchen/Dining

Room ID	Flat	Room Name	Area (m²)	Average DF (%)
TF000004	4	Bedrooms	9.536	3.6
TF000007	5	Bedrooms	10.888	3.6
TF00000C	4	LKD	21.016	3.3
TF00000D	3	LKD	21.016	1.8
TF000005	3	Bedrooms	9.630	4.4
TF000012	1	LKD	21.022	4.4
TF000014	1	Bedrooms	10.167	3.4
TF000016	2	Bedrooms	10.167	3.3
TF000018	2	LKD	20.496	4.4
TF000006	5	LKD	24.635	2.7

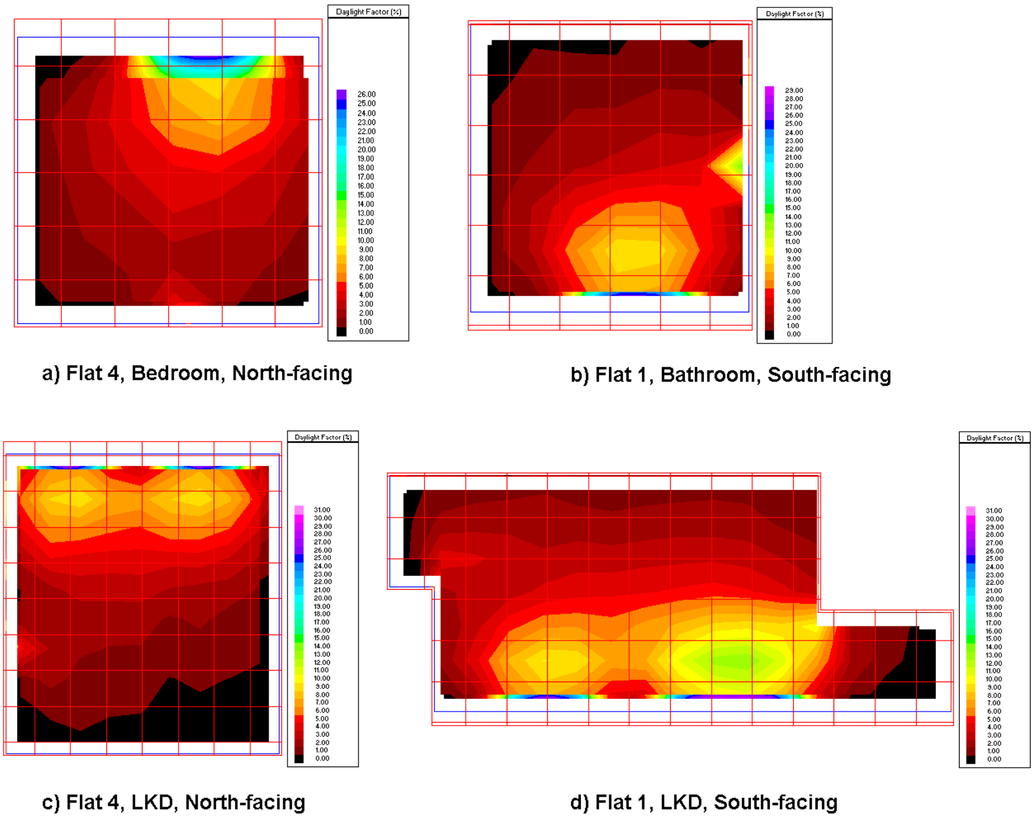


Figure 10 Daylight factor distribution across south and north facing bedrooms and LKD – Living/Kitchen/Dining